Illinois U Library

AMERICAN METEOROLOGICAL SOCIETY

.S815
Han
QC
851
A62
1957
Jan-June

meteorological

abstracts and bibliography

Sponsored by
AIR FORCE CAMBRIDGE RESEARCH CENTER

Bibliography on Solar Relations with Weather, p. 95

Vol. 8 January 1957 No. 1

METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY

EDITORIAL STAFF

Editor and Technical Supervisor: MALCOLM RIGBY

Corresponding Editor: DR. C. E. P. BROOKS

FULL TIME

ISADORE L. DORDICK, *Chief Analyst*
MARY L. RICE, *Assistant Editor-Bibliographer*
WILHELM NUPEN, *Assistant Analyst*
DOROTHY M. GROPP, *Chief Cataloguer*
GEZA THURONYI, *Bibliographer*
MARJORIE CULBERTSON, *Descriptive Cataloguer*

PART TIME

ANDREW ASSUR, *Analyst*
ALEXIS M. POUSHKIN, *Assistant Analyst*
DORA M. BROOKS, *Subject Cataloguer*
WINIFRED SCHRAITLE, *Subject Cataloguer*
MARINA SZE, *Indexer*
MARGARET MATTHEWS, *Descriptive Cataloguer*
KATHERINE MARTINOFF, *Technical Editor*
SUSANNE MANOVILL, *Assistant Technical Editor*
BEVERLY HUGHES, *Assistant Technical Editor*

*EDITORIAL OFFICE: Washington, D. C. P.O. ADDRESS: Box 1736, Washington 13, D. C. Telephone: REpublic 7–6278.

ADMINISTRATIVE OFFICE: American Meteorological Society, Office of Executive Secretary, 3 Joy Street, Boston 8, Mass.

* Address all business communications, orders and inquiries to the Executive Secretary, Mr. Kenneth C. Spengler, 3 Joy Street, Boston 8, Mass. Exchanges and reprints may be sent direct to P. O. Box 1736, Washington 13, D. C.

METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY is a monthly publication devoted to:

A. Current Abstracts in English on important meteorological literature in every language.

B. Bibliographic references to other items of interest to the profession.

C. Selective, annotated bibliographies on subjects of immediate and special interest to meteorologists.

SUBSCRIPTION RATE: $8.00 per year to members and non members. Single and back issues $2.00. Back volumes, $10 per volume.

This publication has been made possible through support and sponsorship extended by the Geophysics Research Directorate of the Air Force Cambridge Research Center, Air Research and Development Command, under Contract No. A. F. 19 (604)-2062.

METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY

MALCOLM RIGBY, Editor

Vol. 8 JANUARY, 1957 No. 1

SPECIAL FEATURE IN THIS ISSUE

An Annotated Bibliography on Solar Relations with Weather

by
C. E. P. Brooks

(*For complete table of contents see back cover*)

Published monthly at Prince and Lemon Streets, Lancaster, Pa., by the AMERICAN METEOROLOGICAL SOCIETY, 3 Joy Street, Boston 8, Mass.

Printed and issued by: Lancaster Press, Inc.

0 16.5515
A512m
1957
pt. 1
1127

A new Prometheus, chained upon the rock,
Still grasping in his hand the fire of Jove,
It does not hear the cry, nor heed the shock,
But hails the mariner with words of love.

"Sail on!" it says, "sail on, yet stately ships,
And with your floating bridge the ocean span;
Be mine to guard this light from all eclipse,
Be yours to bring man nearer unto man!"

From: **The Lighthouse,** by
HENRY W. LONGFELLOW

EDITORIAL

With this issue of Meteorological Abstracts and Bibliography, the American Meteorological ciety begins the 8th volume in a unique bibliographic series which attempts to (a) bring to those erested in Meteorology and related fields of Geophysics, information on current publications in r 30 languages and from 100 countries throughout the world; (b) provide a cross-section or spective of current and past literature, in selected narrow fields or areas of interest to Meteorgists, by means of special bibliographies (over 75 have been published in the first 7 volumes); l (c) to organize systematically and index for quick reference or "retrospective retrieval" the tinent information in these publications as to authors, institutions, periodicals, serials, subjects l geographical places.

The total number of abstracts published in the 7 volumes is >36,000 (there has been some etition of items, but this is compensated for by an equal number of combinations of 2 or more ns in one abstract). In addition, about 10,000 titles which have not yet appeared in either the rrent Abstracts or the Special Bibliographies have been published in Part III (which analyzes rent serials, etc.). Of these 36,000 abstracts and 10,000 additional titles (plus indexes comprising all about 11,000 pages), over 25,000 have been "Current." There has been a steady increase til 1956) in the number of abstracts published each year, as can be seen from the following table:

Vol.	Year	Abstracts		Vol.	Year	Abstracts	
		Total	*Current			Total	*Current
I	1950	3840	2500	V	1954	5284	4200
II	1951	4499	3200	VI	1955	6294	4500
III	1952	5193	3800	VII	1956	#5420	4700
IV	1953	5706	4000				
				Total	1950–56	36,236	26,900

Incidentally, we have been accumulating a backlog of at least 1000 unpublished abstracts each r, and there are at least 1000 items published somewhere in the world each year that do not come hand for abstracting, so that the total production of items of meteorological interest is now mated to be 6,000 or 7,000 a year, depending on whether a broad or narrow definition of Meteorgy is applied.

The terms Geophysics and Meteorology both have narrow and broad definitions which make m somewhat ambiguous. For years Meteorology was considered to be merely the study of the *ysics of the Atmosphere* and the application thereof to weather forecasting, just as Geophysics s considered to be merely the study of the *Physics of the Earth's Crust*, and its application to geoical, hydrological or glaciological prospecting.

Recently the term Geophysics has been broadened to include the study of the physics of the eans and the Atmosphere, and in keeping with the current trend away from over specialization compartmentalization of the sciences, even meteorologists trained in the rigorous Norwegian ool of Hydrodynamical Meteorology have come to recognize the fact that Meteorology is really "*Science* of the Atmosphere," which includes not only the Physics but the History, Chemistry, ology, and Biology of the atmosphere; and their application to fields such as Aeronautics, Agriture, Architecture, Commerce, Forestry, Hydrology, Industry, etc.; as well as to peripheral nces such as Geomagnetism, Oceanography, Astrophysics, Biology, Geomorphology, etc. As rl Gustav Rossby so aptly expressed it at the Annual Meeting of the American Met. Society in

* Estimated number of current abstracts; i.e. abstracts of articles published since 1949. Many hese are published for the first time in the Special Bibliography Section (Part II).

Decrease in 1956 was not due to decrease in production of meteorological articles during 6, but to a limited budget for printing. The number of items in Special Bibliographies were uced over 1955, and the percentage of "Current" items published in Special Bibliographies was reased.

New York on January 30, 1957: "*The interests of meteorologists (and hence of the Meteorological Society) are such that they must consider the atmosphere not only as a medium wherein physical processes occur which affect the weather, but as a carrier for all manner of chemical, geological and biologically harmful or beneficial substances, both natural and artificial; and finally as a milieu in which a number of geophysical processes (such as the aurora, geomagnetism, cosmic rays, etc.) are taking place.* [These were not his exact words but a reasonable paraphrasing thereof.]

An objective estimate of the quantity of literature in the field of Meteorology, compared with that in Geophysics (using the broader definition of Geophysics), may be obtained by a tabulation of the number of items published each year in the section 55 (for Geophysics) of *Physics Abstracts*, and a breakdown of these statistics according to the number classified under 551.5 (Atmosphere-Meteorology) compared with the number of items classified under 55 but not under 551.5. The following table gives the annual and total number for the years 1950–56, incl. It will be seen that the percentage of Geophysical items classified as Meteorology ranges from 73% to 85% with an average of 80%. This runs very close to our own experience gained from perusing Geophysical Journals from various parts of the world. Although our selection and classification may bias some items toward Meteorology which a more objective classifier would class as non-Meteorological, yet our sample is 10 times as great (36,000 instead of 2900) so is perhaps more representative of the total output of Geophysical literature.

Number of Geophysical and Meteorological Papers in *Physics Abstracts*, 1950–1956, incl.

Year	Geoph.	Meteorol.		Non-Met.	
	55	551.5	%	55-551.4	%
1950	399	292	73%	107	27%
1951	444	339	76%	105	24%
1952	393	320	82%	73	18%
1953	317	241	76%	76	24%
1954	502	417	83%	85	17%
1955	394	327	83%	67	17%
1956	424	360	85%	64	15%
Tot.	2873	2296	80%	577	20%

During the present and coming year, as every schoolboy knows, the greatest cooperative international effort ever undertaken in the field of science will take place. About 50 countries will spend upwards of $500 million to learn more about the earth and its atmosphere. Mountains of data will be collected, coming from all parts of the world and accumulating in vast data storage and processing centers in several continents. But the results of the analysis of these data will tell the story, in the long-run, of the success or failure of this enterprise in terms of new scientific insight or greater knowledge of the medium we inhabit, and the ultimate practical results will accrue from the use of this scientific *information* (as distinguished from raw *observational data*) in fields such as solar power utilization, TV or radio communication, air or rocket transportation, agriculture and medicine, etc. If this information is to be used it must be readily available to workers in every discipline of science or technology in every land, and it must be available in a form which will facilitate quick retrieval. Machines cannot be depended on, for they are not yet developed to the point where they can be applied to this type of information retrieval within the next 5 or even 10 crucial years. Furthermore machines are not available to workers in most laboratories or schools, whereas published abstracts and indexes can be used by anyone in the remotest corner of the earth, or on the highest mountain, or in a center where too many people have priorities for the precious machine time to permit anyone who wants service to obtain it.

So it is evident that the effort we are making, with all of its limitations and shortcomings as to thoroughness of coverage, promptness of publication and adequacy of indexing, will be the only generally available condensed source of information retrieval for the major part of the field which is embraced by the International Geophysical Year Program. The fields of *Meteorology*, *Aurora and Airglow*, *Oceanography*, *Cosmic Rays*, *Ionospheric Physics*, *Rocketry*, and *Glaciology*, especially in their synoptic aspects (which are the very aspects specified for consideration in the IGY program) all come within the scope of our abstracting. Material on *Geomagnetism* has been abstracted more or less consistently, but space and budget limitations have not permitted its publication. Some material on *Solar Activity*, and *Seismology* (Microseisms) has also been treated, so only the fields of *Longitudes and Latitudes*, and *Gravity* have been outside the scope of *Meteorological Abstracts and Bibliography* and hence completely neglected.

Thus it can be seen that by almost any criterion one wishes to use, the greater part of the literature emanating from the Geophysical Year results (as well as older source material for studies of the thousands of special problems which will present themselves when the IGY data become available) will be found in a handy, fully indexed, reasonably accurate and comprehensive, and freely available (throughout the world) form, which is unique and can only offend by being called *Meteorological* instead of *Geophysical*. It is hoped that by bringing together this information on the efforts of co-workers from every land, we will, like Prometheus, have helped to keep the light (of science) from eclipse and incidentally helped others to "bring man nearer unto man."

MALCOLM RIGBY

FOREWORD

Meteorological Abstracts and Bibliography is a monthly publication whose purpose is to ing to the attention of meteorologists current literature in their field and in related fields and provide bibliographic information on various subjects, as interest demands.

Part I contains abstracts of current literature in the fields of meteorology, oceanography, c., arranged according to the Universal Decimal Classification.

Part II of each issue comprises an annotated bibliography of important references on a ecial subject (usually arranged chronologically). No attempt is made to prepare exhaustive bliographies; instead, the aim is to include a representative cross section of the various pects of a subject.

Bibliographies published in the successive issues were:

Vol. I, 1950

Atmos. Pollution	2. Aerobiology	3. Cloud Physics	4. Hail
Tornadoes	6. Volcanic Dust	7. Climat. Changes	8. Thunderstorms
Icing	10. Acoust. Propagation	11. Evaporation	

Vol. II, 1951

Extended Forecast.	2. Long Range Forecast.	3. Soil Temp.	4. Constants, etc.
Clim. of Near East	6. Clim. of Middle East	7. Special Winds	8. Radar Storm De-
Condensation Trails	10. Clim. of N.E. Africa	11. Mountain Met.	tect.

Vol. III, 1952

Clim. of N.W. Africa	2. Carbon Dioxide	3. Clim. of Argentina, etc.	4. Dew
Objective Forecast.	6. Stratus Forecast.	7. Urban Climatology	8. Clim. of C. Africa
Visibility	10. Glaze and Rime	11. Free Air Turbulence	

Vol. IV, 1953

Turbulence Theory	2. Turbulent Diffusion	3. Frost	4. Clim. of Australia, etc
High Level Winds	6. Winds in Stratosphere	7. Jet Stream	8. Radiation Bioclim.
Clim. of Pacific	10. Auroras	11. Sferics	

Vol. V, 1954

Oceanog. Met.	2. Clim. of S.E. Asia	3. Auroral Physics	4. Tropopause
Balloons	6. Numerical Forecast.	7. Radiation Data	8. Vertical Motion
Clim. of Arctic	10. Industrial Met.	11. Wind Waves and Swell	

Vol. VI, 1955

. Bibliog. of Bibliog.	2. Texts & Monogr. Bibliogs.	3. Storm Surges
. Ionospheric Prop.	5. Photochem.—Upper Atmos.	6. Cloud Physics
. Radar Cloud Physics	8. Atmos. Nuclei (1841–1950)	9. Atmos. Nuclei (1951–1955)
. Weather Modification	11. Cooling Power	

Vol. VII, 1956

. Synoptic Met.-Arctic	2. Clim. of Enclosed Spaces	3. Cosmic Rays (–1952)
. Cosmic Rays (1953–56)	5. Atmos. Radioactivity	6. Inversions
. Snow Micromet.	8. Snow Micromet. (Suppl.)	9. Tropical Cyclones
. Hurricane Damage	11. Tropical Cyclone Theory	

Bibliography published this month is:

Solar Relations with Weather, Vol. 8, No. 1, Jan. 1957

Forthcoming bibliography will be:

Night Airglow, Vol. 8, No. 2, Feb. 1957

Other bibliographies in preparation are:

Actinometers	*Ozone*
Forecasting of Special Elements	*Radio Astronomy*
Forest Micrometeorology	*Singularities*
Microwave Propagation	*Synoptic Aerology*

Part III contains a listing of reviews, translations, reprints, and the contents of important blications. These are published in the earliest issue where space permits.

Part IV is made up of author, subject and geographical indexes. The December issue nprises cumulative author, subject, geographical and journal indexes.

EXPLANATIONS

Location of material: For each entry, a symbol is given for at least one library where the material may be found. The Union List of Serials (Gregory) is the source of most of the symbols used. In some cases, where no symbol has been assigned to a library, one will be devised according to the principles of the Union List.

Library symbols used frequently may be found in the following list:

DA:	U. S. Dept. of Agriculture Library, Washington, D. C.
DBS:	U. S. Bureau of Standards Library, Washington, D. C.
DGS:	U. S. Geological Survey Library, Washington, D. C.
DLC:	Library of Congress, Washington, D. C.
DN-HO:	U. S. Navy Hydrographic Office Library, Suitland, Md.
DSG:	U. S. Army Medical Library, Washington, D. C.
DSI:	Smithsonian Institution Library, Washington, D. C.
DWB:	U. S. Weather Bureau Library, Washington, D. C.
GB-MO:	Great Britain, Meteorological Office Library, Harrow, England.
MH-BH:	Harvard University, Blue Hill Observatory Library, Milton, Mass.

Other symbols:

*	before an entry indicates a good data source.
†	before an entry indicates a good bibliography.
§	before an entry indicates a synoptic case history study accompanied by charts

Geographic locations are in the English form rather than the form used locally, for example Moscow for Moskva.

Titles of articles or monographs are in the language of the original article unless otherwise stated. Slavic (Cyrillic) titles are transliterated into the Roman alphabet according to the Library of Congress transliteration scheme.

Abbreviations:

Titles of periodicals are not abbreviated, as a rule.

The months of the year from March to July are not abbreviated. Other months are abbreviated as Jan., Feb., Aug., Sept., Oct., Nov., and Dec.

The word or abbreviation for Volume (Tom, Band, Jahrgang, Año, etc.), for Number (Heft, Fascicule, Vypusk, etc.) and for page or pages is omitted from most entries. Thus an entry will read as follows:

Meteorologische Rundschau, 2(5/6):146–151, May/June 1950.

This indicates that the article appeared in *Meteorologische Rundschau*, *Jahrgang* 2 (Vol. 2), *Heft* 5/6 (No. 5/6), *pages* 146–151, May/June 1950.

PART I. ABSTRACTS OF CURRENT METEOROLOGICAL MATERIAL

MAJOR GENERAL WORKS

COLLECTED WORKS

8.1–1 551.5:061.1

Takacs, Lajos, (*ed.*), **Időjáráskutatók otthonában.** [At home with meteorologists.] *Hungary. Országos Meteorológiai Intézet, Népszerü Kiadványai*, Vol. 5, pub. Budapest, **1955.** 228 p. numerous illus., figs. **DWB**—This popular book is a series of papers by a score of authors discussing applications of meteorology and describing details of the activities of the Hungarian Meteorological Institute. Some of the topics covered in the various chapters are: the birth of a popular book; history of Hungarian Meteorology since its known beginnings in 1780; history of international meteorology; examples of the Hungarian Meteorological Institute's testimony in legal cases; how inquiries by telephone, mail or in person are handled at the Institute; suggestions for weather observation without instruments; micrometeorology of barns; agricultural meteorology; the meaning of terms used in daily weather reports; heating on the basis of weather reports; aviation meteorology and flight weather service (several detailed chapters); the storm warning service on Lake Balaton; long-range forecasting, and magnetic storms. Interiors and exteriors of various buildings of the Hungarian Meteorological Service are shown in photographs. *Subject Headings:* **1. Applied meteorology 2. Hungarian Meteorological Service. I. Aujeszky, L. II. Bacsó, N. III. Berkes, Z. IV. Békéssy, Andrásné V. Béll, B. VI. Csizsinsky, Márta VII. Dési, F. VIII. Flórián, E. IX. Gaál, Elek X. Hille, A. XI. Kadocsa, Franciska XII. Kőrösi, György XIII. Kulin, I. XIV. Péczely, Gy. XV. Rajkai, Ödön XVI. Szilágyi, T. XVII. Veress, L. XVIII. Zách, A.**—*G.T.*

8.1–2 551.5:061.3

International Union of Geodesy and Geophysics. Association of Meteorology, Rome, Sept. 1954, **Scientific Proceedings.** London, pub. for the I.U.G.G. Association of Meteorology by Butterworths Scientific Publications, **1956.** 594 p. figs., tables, refs., bibliogs. throughout. Price: 80 sh. Its *Publications AIM*, No. 10/c, **1956. DWB**—The various sessions held at this congress are as follows: synoptic meteorology, cloud physics, climatology, atmospheric ozone and stratospheric circulation, instrumental research program, dynamic meteorology, general circulations of the atmospheric storm tides, tropical meteorology and its relationships between the circulation of tropical and extratropical latitudes, meteorological instrumentation, atmospheric electricity, meridional large scale circulation, precipitation, numerical and dynamical methods in synoptic meteorology, the mesosphere, radiation in the atmosphere, radiation balance in the lower stratosphere and substratosphere. The names of the chairmen of each session are listed. The individual papers will be abstracted separately. The officers of the International Association of Meteorology for the period 1954/57 and of the various committees are listed. (For reviews of this item, *see* p. 120 of this issue of *MAB*; for contents, *see* p. 126.) *Subject Headings:* **1. Conference reports 2. I.U.G.G. Meetings, Rome, 1954.** —*I.L.D.*

8.1–3 551.509.67:08

Symposium on Artificial Rain, New Delhi, Feb. 1953, **[Proceedings and papers] of Symposium held under joint auspices of Atmospheric Research Committee, CSIR and India Meteorological Dept.** New Delhi, Council of Scientific and Industrial Research, **1955.** 148 p. figs., tables, foot-refs., bibliogs. **Selective bibliography on artificial rain,** taken from *MAB*, Vol. 1, No. 3, 1950, and other sources, p. 135–148 (187 items). **DWB.** Review by K. R. S. in *Science and Culture*, Calcutta, 22(3):185–186, Sept. **1956. DLC**—At this symposium, held on Feb. 9 and 10, 1953, in the Meteorological Offices, New Delhi, under the chairmanship

of the Director, V. V. SOHONI, 20 papers were presented and discussed. It was concluded that: 1) results of seeding attempts to date were inconclusive, 2) the most favorable conditions for successful seeding would be found in regions where natural precipitation is most likely and 3) neither CO_2, AgI or H_2O (warm cloud) seeding had yet produced effective increase in precipitation in arid regions or drought areas. Further study was deemed vital, both in controlled experiments and in methods of evaluating. Twelve of the 20 papers are printed in full, 8 in abstract form. (For contents, *see* p. 137 of this issue of *MAB.*) *Subject Headings:* **1. Artificial precipitation symposia 2. Artificial precipitation bibliographies 3. New Delhi, India.**—*M.R.*

8.1–4 551.509:616

§Kuhnke, Wolfgang, **Meteorologische Grundlagen einer medizin-meteorologischen Vorhersage.** [Meteorological bases of a medical-meteorological forecast.] *Annalen der Meteorologie, Medizin-Meteorologische Hefte*, Hamburg, No. 11:3–20, 1956. 20 figs. Also: Becker, Friedrich, **Arbeitsgrundlage der medizin-meteorologischen Vorhersage im Königsteiner Arbeitskreis.** [Working basis of medical-meteorological forecasting in the Königstein working group.] *Ibid.*, p. 21–25. 2 figs., 4 refs. Also: Ungeheuer, Hans, **Ein meteorologischer Beitrag zu Grundproblemen der Medizin-Meteorologie.** [A meteorological contribution to the basic problems of medical meteorology.] *Ibid.*, p. 26–29. 7 figs. Also: Daubert, Karl, **Einige Beispiele meteorotroper Wettersituationen und Ergebnisse der medizin-meteorologischen Vorhersagen an Hand des Tübinger Krankenmaterials.** [Some examples of meteorotropic weather situations and results of medical-meteorological forecasts on the basis of clinical material from Tübingen.] *Ibid.*, p. 30–36. 13 figs., 12 refs. Also: Beleke, Hans, **Der Arzt und die medizin-meteorologische Vorhersage sowie Standpunkt des Internisten.** [The doctor and the medical-meteorological forecast and the viewpoint of the internist.] *Ibid.*, p. 37–40. Also: Straube, G., **Der Standpunkt des Sanatoriumarztes zur medizin-meteorologischen Vorhersage.** [The standpoint of the sanatorium doctor on medical-meteorological forecasts.] *Ibid.*, p. 41–42. Also: Kümmel, Hermann, **Standpunkt des Chirurgen zur medizin-meteorologischen Vorhersage.** [Standpoint of surgeons on medical-meteorological forecasts.] *Ibid.*, p. 43–48, 5 figs., 3 refs. Also: Harry, Walter, **Die Bedeutung der medizin-meteorologischen Vorhersage für den praktischen Arzt.** [The importance of the medical-meteorological forecast for the general practitioner.] *Ibid.*, p. 49. Also: Rickmann, Ludger, **Welchen Nutzen hat eine medizin-meteorologische Vorhersage für die Behandlung im Lungensanatorium?** [Of what use are medical-meteorological forecasts in treating pulmonary diseases in a sanatorium?] *Ibid.*, p. 51–53. **DWB**—This group of papers deals with forecasting from the medical point of view. KUHNKE classifies general weather types into meridional (tropical and polar, both subdivided), zonal (west or east) and anticyclonic, with examples of surface pressures and 500 mb levels and "biometeorograms" including upper air temperatures, air masses, temperature, radiation, sunspots, geomagnetism, ozone, austausch and death rate. These are discussed in detail. The weather type is a better guide than climatic elements, which change rapidly from place to place. BECKER summarizes the results of over 6 years of medical weather chart analysis at Königstein and gives 2 "bioclimograms." The analysis scheme is set out. UNGEHEUER states that at Bad Tolz the basic assumption is that only special weather situations are medically active. He recognizes a cycle of 6 types from settled fine through storm to clearing and sets out the various effects of several medical symptoms (including deaths) in this cycle. DAUBERT plots numbers of cases of diseases in different stages of the transition from high to low and back again, with surface and 500 mb charts for special cases and meteorotropic intensity. BELEKE briefly describes statistical, laboratory and dynamic methods of research. The forecasts are still experimental and distributed to a limited circle; problems of application are discussed. KÜMMELL is concerned with the influence of weather on post-operative complications and their forecasting, including the effect of long-wave high frequency radiations and the jet stream, and the possibility of shielding. HARRY, in a brief summary, considers weather-sensibility as a symptom of vegetative neuroses. RICKMANN takes up the point of view of the doctor in a lung-tuberculosis sanatorium, to whom "meteoroprophylaxy" is even more important than meteoroclimatherapy. *Subject Headings:* **1. Medical meteorological forecasting 2. Symposia.**—*C.E.P.B.*

8.1–5 551.509.6:061.3

Conference on the Scientific Basis of Weather Modification Studies, Univ. of Arizona, Tucson, April 10–12, 1956, **Proceedings.** pub. by Univ. of Arizona, **1956.** each paper repaged. Abstracts of most papers presented at Conference with full reproduction of two: Byers, H. R., **Historical resume of research relating to weather modification,** and Houghton, Henry G., **Some impressions at the close of the Conference. DWB**—The preprints, and abstracts of papers not in preprint form, for the conference at Tucson on weather modification, were re-run in this Conference Proceedings along with the two papers (cited above) by Byers and by Houghton. The latter will be abstracted separately. General conference notes include a summary of the objectives, agenda, list of 35 participants and 39 observers and their affiliations, and other transactions. (For contents, *see* p. 124 in this issue of *MAB.*) *Subject Headings:* **1. Weather modification conferences 2. Cloud physics symposia. I. Arizona. Univ. Institute of Atmospheric Physics II. Byers, H. R. III. Houghton, H. G.**—*M.R.*

TEXTBOOKS

8.1–6 551.511(02)

§Raethjen, Paul, **Zirkulationen der Atmosphäre. (Kurzer Abriss der Meteorologie, dynamisch gesehen, Teil 3.)** [Circulations of the atmosphere. (Pt. 3 of Short outline in meteorology from the dynamic viewpoint.)] *Geophysikalische Einzelschriften,* No. 3, pub. Hamburg, **1954.** p. 156–234. figs., refs. **DWB**—In this third part to Raethjen's outline of dynamic meteorology (being published over a period of years), the general and several specific problems of the atmospheric circulation are treated in detail from a theoretical standpoint, but with realistic models. The meridional circulation from equator to poles and back (which does not exist in any permanent form except in the monsoon regions of low latitudes) the sources of energy, effects of friction and earth's rotation, the planetary and monsoonal pressure field and friction balance, meridional exchange of mass and heat, zonal circulation (west wind) and tropopause circulation, disturbances, long waves, blocking and delta disturbances, diurnal and monsoonal (valley, land, sea and continental) and latitude effects are discussed. (For Pt. 1, *see* 7–29, July, 1950; and for Pt. 2, *see* 10–82, Oct. 1950, *MAB.*) *Subject Headings:* **1. Dynamic meteorology textbooks 2. Atmospheric circulation.**—*M.R.*

8.1–7 551.506.8(02)

†*Schnelle, Fritz, **Pflanzen-Phänologie.** [Plant phenology.] Leipzig, Akademische Verlagsgesellschaft Geest und Portig K.-G., **1955.** 299 p. 46 figs., 14 maps, tables, 6 refs., numerous foot-refs. *Probleme der Bioklimatologie,* Vol. 3, **1955. DWB**—This is perhaps the most comprehensive and systematic treatise on plant phenology that is available. An attempt is made to present the subject in a manner that stresses the precision of the observations and their amenability to quantitative treatment. The contents are as follows: the history of plant phenology in Germany and in other countries; the procedure for making phenological observations in Germany and elsewhere; the nature of the observations and phenometry; the organization of the phenological service, reporting service, phenological land surveys, phenological gardens, etc.; evaluation of observations, including their verification and quantitative analysis, graphic and tabular presentation, etc.; interpretation of analyzed observations and their correlation in time and space; and the value of phenology in agricultural climatology, medicine, aviation, etc. The book contains numerous tables, graphs and illustrations. A portfolio of phenological charts for West Germany is included. Review by F. Seyfert in *Angewandte Meteorologie,* Berlin, 2(7):222–223, April **1956.** *Subject Heading:* **1. Plant phenology textbooks.**—*I.L.D.*

8.1–8 533.6(02)(09)

†von Kármán, Theodore, **Aerodynamics. Selected topics in the light of their historical development.** Ithaca, N. Y., Cornell University Press, **1954.** 203 p. 72 figs. (incl. photos), ports., bibliog. at end of each chapter. **DLC**—Six chapters review progress or history of 1) aerodynamic research before era of flight, 2) the theory of lift, 3) theories of drag and skin friction, 4) supersonic aerodynamics, 5) stability and aeroelasticity and 6) propellers and jets and interplanetary travel. The book contains an amazing amount of historical, biographical, technical and scientific information and data (charts, tables, etc.) on aerodynamic theory and

development. *Subject Headings:* **1. Aerodynamics 2. History of aerodynamics 3. Textbooks.**—*M.R.*

8.1–9 551.48(02)

†Blizniak, Evgeniĭ Varfolomeevich, **Vodnye issledovania.** [Water investigations.] 5th ed. rev. & enl. Moscow, Izdat. Ministerstva Rechnogo Flota SSSR, **1952.** 651 p. 382 figs. (incl. maps, fold.), 16 tables, numerous bibliogs. **Meteorologicheskie i klimaticheskie raboty.** [Meteorological and climatological work.] 240. p. **DLC** —This is a substantial and exhaustive treatise on the hydrology of rivers, lakes, bogs, soil, etc., with full treatment of the geological, hydrometric, meteorological, geochemical geobotanical, photogrammetric and other aspects of each. Meteorological stations, instruments and observations are treated on p. 240–263, meteorological applications to river hydrology on p. 536, and to lake hydrology on p. 577–579. Lake waves and seiches are treated on p. 562–573, and the thermal regime of lakes on p. 573-576. Ice in lakes is covered on p. 576 -577, and in rivers on p. 219–238, and waves in rivers on p. 239 (extensive bibliography at end of each chapter). The author is more concerned with the measurement of parameters and compilation of data than with forecasting. *Subject Headings:* **1. Hydrology textbooks 2. Lake hydrology 3. River hydrology.**—*M.R.*

8.1–10 551.579(02)

*Domanevskiĭ, N. A., **Gidrologiia i gidrometriia.** [Hydrology and hydrometry.] Moscow, Izdat. Ministerstva Rechnogo Flota, **1951.** 363 p. 233 figs., 52 tables, 17 refs., 192 eqs. **DLC**—This textbook for students of engineering or hydrology is divided into two sections and 25 chapters. The first section **Hydrology** takes up the hydrologic cycle and water balance in nature, meteorological factors (p. 16–18) including temperature, humidity, condensation, precipitation, evaporation, pressure, wind and meteorological stations, ground water, rivers, spring floods and frozen rivers, runoff, lakes, bogs and forecasting runoff and water levels. Pt. 2, **Hydrometry,** deals with methods of measuring the various hydrologic parameters, including physico-chemical characteristics of water. Much tabular data as well as charts, nomograms and illustrations of equipment are included—for example, a chart (p. 38) of European U.S.S.R. shows isolines of annual evaporation in mm and a table (p. 37) shows monthly variations in evaporation for 6 Russian cities. *Subject Headings:* **1. Hydrology textbooks 2. U.S.S.R.**—*M.R.*

8.1–11 551.509(02)

§Takahashi, Koichiro, **Tenki-Yoho Kowa.** [Lectures on weather forecasting.] Tokyo, Chizin Book Co., Ltd. **1948.** 195 p. 46 tables, 73 figs. **DLC** --Unique experiences in weather forecasting. Titles of 10 chapters are: 1. Introduction, 2. Transfer of heat and water vapor in the atmosphere, 3. Air mass, 4. Wind and barometric pressure distribution, 5. Weather synoptic chart, 6. Lines of discontinuity, 7. Cyclone, 8. Anticyclone, 9. Forecasting of several weather elements and 10. Long-range weather forecasting. Accompanied by numerous synoptic charts for Far East area. *Subject Headings:* **1. Weather forecasting 2. Synoptic charts 3. Textbooks.**—*H. Arakawa.*

POPULAR SCIENCE BOOKS

8.1–12 551.509(023)

Hofmann, Alfred, **Probleme um die Wettervorhersage.** [Problem of weather forecasting.] Stuttgart, Kosmos-Gesellschaft der Naturfreunde, **1955.** 74 p. 24 figs., 2 tables, 12 refs. *Kosmos-Bändchen,* No. 207. **DLC**—Statistical, physical, synoptic and numerical bases for forecasting, especially in West Germany, are discussed systematically with many numerical and graphical examples and illustrations. Subjects discussed are: the hundred year calendar, random forecasts and singularity forecasts (example shows frequency of marine and continental air masses at Karlsruhe, 1881 -1940, with over 30 periods in the 8 seasons); persistence forecasts and their diminishing value after 3–6 days (shown graphically); weather rules, observation, anomalies of winter weather following anomalous autumn weather; solar, lunar and planetary influence; energy and moisture balance and vorticity influences, synoptic networks and problems connected therewith, surface, upper air and numerical forecast charts (illustrated); long range forecasts, and service problems. *Subject Headings:* **1. Weather forecasting 2. Singularities 3. West Germany.**—*M.R.*

8.1–13 551.5:37:087.5

Sandman, Howard E., **Who's afraid of thunder? The story of the weather.** New York, Sterling Pub. Co., **1953.** 61 p. numerous illus. **DLC**—A nicely illustrated book on clouds, storms, weather observation, weather forecasting and other aspects of meteorology written in a conversational narrative style for elementary school children. The story involves a visit to a Weather Bureau Airport Station, where the meteorologist in charge explains the basic principles of meteorology, cloud physics, thunderstorm electricity, thunder and precautions against lightning, as well as instruments, radiosonde observations, etc. A glossary of common terms and suggestions for teachers and students is included. *Subject Headings:* **1. Elementary meteorology 2. Juvenile literature 3. Textbooks.**—*M.R.*

MONOGRAPHS

See also: **Apparatus for recording soil air humidity** (Hofmann), 8.1–147.

8.1–14 551.582(71)

*Kendrew, W. G. (formerly, *Oxford Univ.*) and Currie, B. W. (*Univ. of Sask.*), **The climate of central Canada: Manitoba, Saskatchewan, Alberta and the Districts of Mackenzie and Keewatin.** Ottawa, Edmond Cloutier, **1955.** 194 p. 52 figs., 5 photos, 150 tables. Price: $1.00. **DWB**—An excellently prepared and nicely printed monograph presenting the essential climatic information for central Canada, from the Arctic to the 49th parallel, or roughly 40% of Canada. This is the first of 3 such studies to be published under the auspicies of the Meteorological Division of Canada. The original report was prepared by Currie with complete revision and condensation by Kendrew. The first part deals with the climate of central Canada in general (stations, relief, vegetation, climatic regions, pressure, winds, fronts, temperature, humidity, evaporation, cloud, sunshine, precipitation, thunder, hail, snow, blizzards, drifting snow, visibility, local climate and illumination). Parts 2–6 take up the respective climates of the Mackenzie Basin, the Barren Grounds, Alberta and Saskatchewan forest and parkland, the prairie grasslands and Manitoba with discussion and illustrations of the several important elements under each region. Many charts, tables and photographs are included. *Subject Headings:* **1. Climate of central Canada 2. Climate of Canadian Arctic 3. Central Canada.**—*M.R.*

8.1–15 551.506:551.584(492):63

†*Peerlkamp, Petrus Kornelius, **Bodenmeteorologische onderzoekingen te Wageningen.** [Micrometeorological investigations at Wageningen.] *Wageningen, Netherlands. Landbouwhoogeschool, Mededeelingen,* 47(3), **1944.** 96 p. 32 figs., 15 tables, 51 refs., 24 eqs. Presented as Thesis (Ph.D. in Sc.)—Utrecht Univ., 1943. **DLC**—Elaborate micrometeorological observations made at the agrometeorological experiment station at Wageningen, Holland from 1938–42, are analyzed and presented in numerous tables and graphs. The equipment and layout are shown in excellent photographs of the station, laboratories and separate instruments and plots. The basic observations were begun in 1910 and for many elements continuous records from 1917–42 are used. The 10 chapters take up: 1) objectives of micrometeorological studies for layer from +2 m to −2 m from soil; 2) history and layout, surroundings, equipment, etc.; 3) radiation, sunshine, cloudiness, precipitation and wind; 4) soil temperature at .25, .50 and 1.0 m; 5) agrometeorological observations in field and crops; 6) temperatures at 2.0, .1, −.1, −.2 and −1.0 m in fields and crops; 7) electric recordings at various heights and depths; 8) air and soil moisture; 9) energy and thermal balance and 10) theory of heat exchange in soil. *Subject Headings:* **1. Micrometeorological observations 2. Agricultural meteorology 3. Wageningen, Netherlands.**—*M.R.*

8.1–16 551.524.37:632.1(778)

*Decker, Wayne L., **Late spring and early fall killing freezes in Missouri.** *Missouri. Agricultural Experiment Station, Bulletin,* No. 649, March **1955**; *Climatic Atlas of Missouri,* No. 2. 15 p. 25 figs., 2 tables. **DWB**—Temperature records for 1916–1953 for 44 stations arranged according to 7 districts in Missouri, are tabulated to provide information concerning earliest and latest light, moderate and severe spring and autumn freezes. Isopleths of dates

when there are 50, 29, 10 and 5% chances of killing freezes before (fall) or after (spring) dates (interval 5 days) are presented on 24 charts of Missouri. These growing season freezes occur only when continental polar air from Canada invades Missouri, and usually in valleys or bottoms (except on the Ozark Plateau). A range of 40 to 60 days occurs between extreme dates in spring and fall freezes. The southeast lowlands have longest frost-free season. Effect of slope, wind, cloudy skies and elevation on freeze probability is discussed. *Subject Headings:* **1. Killing frost 2. Frost data 3. Missouri.**—*M.R.*

8.1–17 551.577(778)

*Decker, Wayne L., **Monthly precipitation in Missouri.** *Missouri. Agricultural Experiment Station, Bulletin*, No. 650, March **1955**; *Climatic Atlas of Missouri*, No. 1. 60 p. 38 figs., numerous tables. **DWB**—Average monthly precipitation, average monthly snowfall distribution (Oct.–May), range of monthly precipitation amounts (>10, 25, 50, 75 and 90% probability) are shown on charts of Missouri for each individual month. The actual monthly precipitation and monthly snowfall for 39 stations for each month from 1918–1954 is given in tables in appendix. Several pages of information regarding the measurement of precipitation, sources of Missouri rainfall, network in Missouri, and the average monthly precipitation patterns are included in addition to charts and tables. For instance in Jan., the average precipitation varies from >4.0″ in S.E. to <1.0″ in N.W. corner, whereas in June the pattern is reversed: >5.5″ in N.W. and S.W., and <4.0″ in S.E. corner. Snow varies from average of >6″ in N. to <3.0″ in S.E. in Jan. This is a revision of same title (March 1952). (For abstract, *see* 4.11–215, April 1950, *MAB.*) *Subject Headings:* **1. Precipitation amount 2. Precipitation data 3. Snowfall data 4. Missouri.**—*M.R.*

8.1–18 551.577.37(688)

*Gellert, Johannes F., **Die Niederschlagsschwankungen im Hochland von Südwestafrika.** [Rainfall variation in the highlands of South-West Africa.] *Germany. Deutsche Demokratische Republik. Meteorologischer und Hydrologischer Dienst, Abhandlungen*, 4(32), **1955.** 69 p. 18 maps, 8 figs., 16 tables, 15 refs. **DLC**—This comprehensive monograph on the rainfall variation of the highlands of South-West Africa is based upon an analysis of precipitation for the decade 1928/29–1937/38. Using extensive tabular data, graphs and rainfall charts of this area, the author analyzes the annual rainfall characteristics of this period with special reference to the heavy rainfall year 1933/34, rainfall minima, distribution of rain year groups, drought years, interannual rainfall variations; the climatographic nature of the rain years of the given interval is analyzed on the basis of monthly precipitation and the periodicity precipitation variations in South-West Africa and neighboring areas of South Africa (Union of South Africa) during the period 1928/29–1957/58. *Subject Headings:* **1. Rainfall variations 2. South-West Africa.**—*I.L.D.*

8.1–19 551.524.3(493) 551.577.3

*Vandenplas, A., **Les hivers à Bruxelles-Uccle, 1833–1951.** [Winters at Brussels-Uccle, 1833–1951.] *Belgium. Institut Royal Météorologique, Publications, Ser. A*, No. 2, **1956.** 46 p. 12 figs., 30 tables, 9 refs. **DWB** A remarkably detailed analysis of the winter temperature record for Brussels-Uccle for 1833–1951, and precipitation record for Uccle for 1901–1950. The temperature record is divided into two periods: 1833–1900 and 1901–50, and a complete analysis made of the average maximum, mean maximum, mean, mean minimum and minimum temperatures and number of days with frost for each year for Dec., Jan., Feb. and for the winter, for each of the two periods. Frequencies of days in specified (1°C) class intervals are tabulated by decades and months for 1901–1950, and for months for 1833–1900. Trends are shown for each month and the winter by means of running 10 year means. Frequency of dry and wet periods of varying lengths and of decadal and monthly totals are given in tables and analyzed. Methods, material used and results are analyzed in text. *Subject Headings:* **1. Winter temperatures at Brussels 2. Dry and wet spells 3. Brussels, Belgium 4. Uccle, Belgium.**—*M.R.*

8.1–20 551.577:551.507.2(26)

Skaar, John, **On the measurement of precipitation at sea.** *Geofysiske Publikasjoner*, Oslo, 19(6), **1955.** 32 p. 47 figs. (incl. photos), tables, 8 eqs. Price: 6.00 Kr. **DWB, DLC** —A monograph describing methods of measuring precipitation carried out experimentally on board Ocean Weather Ship "Polarfront I" at 66°N, 2°E (station M) in the Norwegian Sea starting June 1, 1949, and in a gage mounted in a dinghy 50 m from the weather ship. Comparative measurements at 2, 3 and 6 places on board ship were analyzed for March 1950–April 1952, and between the ship and coastal stations in N.W. Norway for two periods with uniform weather conditions. Errors are due to tilting and to sea spray as well as to normal wind, splash and evaporation errors. Each of these sources of error is discussed with respect to ship measurements, and methods of reducing the errors attempted. The results from a score of gages mounted in various parts of the ship and with or without gimbals or shields are tabulated separately and compared with other gages exposed at the same time in different wind conditions. It was found that a gage mounted on the lifeboat deck with the orifice at the same height as the lifeboat shelters gave the best catch when the ship is drifting athwart the wind. The use of gimbals did not change the catch more than 1% so is not recommended. Because of high wind speeds a shield is recommended. A correction for rolling of the ship is not necessary. Sea spray caught with the rain may be measured by testing the salinity chemically or electrolytically, preferably the latter. It is highly variable. Shore stations get heavier precipitation though ship stations have a higher frequency (87% on ship M). Therefore SUPAN's conclusions about rain at sea are questionable. *Review in Rivista di Meteorologia Aeronautica*, Rome, 16(3):45, July/Sept. 1956. *Subject Headings:* **1. Precipitation measurement at sea 2. Weather ship observations WS 3. Wind effects on precipitation measurement 5. Ocean Weather Station M. 6. Norwegian Sea 7. Northwest Norway.**—*M.R.*

MANUALS

See: **Bering Sea and Strait Pilot** (Gt. Brit. Hydrographic Dept.), 8.1–75; **Met. aspects of pressure pattern flight** (U. S. Air Weather Serv.), 8.1–91; **Manual for aeromet. codes** (U. S. W. B.), 8.1–92.

GENERAL GEOPHYSICS

IGY, WMO, IUGG

See also: **Scientific Proceedings** (I.U.G.G. Assoc. of Met.), 8.1–2.

8.1–21 550.3:061.3

Bartnick, L., **Miedzynarodowy rok geofizyczny 1957–1958.** [International Geophysical Year, 1957/1958.] *Przegląd Meteorologiczny i Hydrologiczny*, Warsaw, 7(1/2):61–67, **1954. DWB, DLC**—A detailed analysis and discussion of the aims, program and prospects of the forthcoming International Geophysical Year with special emphasis on meteorological studies. *Subject Headings:* **1. International Geophysical Year, 1957–58 2. International Geophysical Year program.**—*A.M.P.*

8.1–22 550.3:061.3

Basu, S., **The third International Geophysical Year.** *Indian Journal of Meteorology and Geophysics*, New Delhi, 6(3):203–206, July **1955. DLC**—A brief sketch is given of the activities of the previous International Geophysical (Polar) Years and the program of the Indian National Committee for the IGY is outlined. *Subject Headings:* **1. International Geophysical Year, 1957–58 2. Indian participation in IGY.**—*I.L.D.*

8.1–23 550.3:061.3

Chapman, Sydney, **International Geophysical Year and some American aspects of it.** *National Academy of Sciences, Proceedings*, 40(10):924–926, Oct. **1954. DWB**—The history of the IGY, 1957–58 program (which started with a proposal made by LLOYD BERKNER at a

social gathering in Silver Spring, Md. in April 1950) and its relation to the 1st and 2nd International Polar Years is reviewed and the scope of activities and of supporting institutions mentioned. The results of the Polar Years and hoped for results of the IGY are also touched on. *Subject Headings:* **1. International Geophysical Year, 1957–58 2. International Geophysical Year program.**—*M.R.*

8.1–24 551.5:550.3:061.3(99)

Preparations for the International Geophysical Year, 1957/1958. *Madjalah Ilmu Alam Untuk Indonesia* (*Indonesian Journal for Natural Science*), Bandung, 111(1/3):130, Jan./June **1955. DLC**—Short account of Antarctic voyage of icebreaker U.S.S. "Atka" to find sites for additional stations for IGY, 1957–58, and to take daily weather observations for aid in forecasting in Southern Hemisphere, to chart ice conditions, measure ozone density and cosmic rays, etc. *Subject Headings:* **1. International Geophysical Year program 2. Antarctic observational program 3. "Atka" Antarctic Expedition, 1954–55.**—*M.R.*

8.1–25 550.3:061.3

Veldkamp, J., **Het Internationale Geofysische Jaar 1957/58.** [International Geophysical Year, 1957/1958.] *Hemel en Dampkring*, The Hague, 53(7):129–131, July **1955. MH-BH**—Contains a brief account of the history of International Geophysical Year, outlines the program of the 1957–58 Geophysical Year in the fields of meteorology, terrestrial magnetism, auroras and light of the night sky, inosphere research, cosmic radiation, latitude and longitude determinations, glaciology, oceanography and rockets. The Dutch role in the present geophysical year will consist of establishing geophysical stations at Hollandia, New Guinea, and Paramaribo, Surinam, for the study of terrestrial magnetism, the ionosphere and radio waves from the sun. *Subject Headings:* **1. International Geophysical Year program 2. Netherlands participation in IGY.**—*I.L.D.*

8.1–26 629.19:551.521

Wackernagel, Hans Beat, **Das Satellitenprojekt.** [The satellite project.] *Leben und Umwelt*, Basel, 12(7):160–162, April **1956.** 2 figs. **DWB**—Account of the suggested MOUSE satellite, to which the U. S. project is probably similar. Diagrams (labelled in English) are given of the orbit and instrumentation. From such a satellite much could be learned about solar corpuscular radiation, micrometeorites, earth albedo, etc. *Subject Headings:* **1. Satellite observatories 2. Radiation research.**—*C.E.P.B.*

8.1–27 551.509:061.3

World Meteorological Organization. Commission for Synoptic Meteorology, **Abridged final report of the First Session, Washington, April 2–9, 1953.** *WMO, WMO* [Pub.], No. 16. RP. 7, **1953.** 222 p. forms. Price: Sw. fr. 6. **DWB**—Contains list of delegates and others attending, agenda list and index of the 136 documents considered at the sessions. Of the 53 countries having members on the commission, 28 sent delegates. Abridged summaries of sessions, resolutions and recommendations are included. Code forms of the various types are given in considerable detail. *Subject Headings:* **1. WMO. Synoptic Meteorology Commission 2. Conference reports.**—*M.R.*

8.1–28 551.5:061.3

Meteorology in Europe: opening of second session of Regional Association VI. *World Meteorological Organization, WMO Bulletin*, 5(2):51–52, April **1956.** 2 photos. **DWB**—The highlights of the WMO Regional Association VI meeting at Dubrovnik, Yugoslavia, on March 12–24, 1956 are given. JEAN LUGEON of Switzerland was moderator. ALF NYBERG of Sweden succeeds LUGEON as President of RA VI. A report of the work will appear in the next issue of the WMO Bulletin. *Subject Headings:* **1. WMO. Regional Association VI (Europe) 2. WMO meetings.**—*M.R.*

8.1–29 551.5:06

Collaboration with other international organizations. *World Meteorological Organization, WMO Bulletin*, 5(2):60–64, April **1956.** photo. **DWB**—Reports on WMO representation at the ICAO North Atlantic Regional Air Navigation meeting at Paris Feb. 20-March 3, 1956 where traffic congestion over the N. Atlantic was discussed in connection with meteorological reports and flight plans and on the FAO conference on Fisheries at Tokyo Sept. 30–Oct. 14, 1955, where a paper on the role of WMO in providing weather information for fisheries was presented, and note made of the fact that the climatic amelioration of the sub-Arctic has resulted in northward extension of cod and other organisms in the ocean in the past 25-30 yrs, so the area of greatest density has moved N. about 300 mi on west coast of Greenland. The first Fisheries Year for Indo-Pacific area will be held in 1957–58 to correspond with IGY. Documentation problems were discussed at a UNESCO meeting Nov. 17–19, 1955. *Subject Headings:* **1. WMO collaboration with international organizations 2. ICAO meetings 3. FAO conferences 4. Warming of Arctic 5. UNESCO documentation.**—*M.R.*

8.1–30 551.5:012:061.3

†**Publications of the WMO.** *World Meteorological Organization, WMO Bulletin*, 5(2):65–68, April **1956. DWB**—A list of numerous reports, technical publications and documents of the WMO from 1951–1956, languages issued in, and price of each. *Subject Headings:* **1. WMO publications 2. Bibliography of WMO publications.**—*M.R.*

8.1–31 551.5:061.3

Uruguay. Servicio Meteorológico, **La Organización Meteorológica Mundial.** [World Meteorological Organization.] *Revista Meteorológica*, Montevideo, 13(46):57–62, June **1954. MH-BH**—Principal objectives and organizational structure (general assembly, executive committee, regional associations, technical commissions, secretariat) of WMO are outlined. *Subject Heading:* **1. World Meteorological Organization.**—*G.T.*

EXPEDITIONS—ARCTIC RESEARCH

8.1–32 551.506.5:91.04(97)

Holdgate, M. W.; LeMaitre, R. W.; Swales, M. K. and Wace, N. M., **The Gough Island scientific survey, 1955–56.** *Nature*, London, 178(4527):234–236, Aug. 4, **1956.** 5 refs. **DWB**—The British expedition landed on Gough Island on Nov. 13, 1955, and left on May 13, 1956, but the meteorological station is being maintained by the South African Weather Bureau until the end of the Geophysical Year. Survey, meteorology, geology, botany and zoology are briefly described. *Subject Headings:* **1. Expeditions 2. Gough Island.**—*C.E.P.B.*

8.1–33 551.5:629.13(98)

Lee, Millard A., **Loran in polar regions.** *Navigation*, Los Angeles, 4(8):323–326, Dec. **1955.** fig. **DWB, DLC**—The significance of Loran to aerial navigation over the polar ice pack is discussed. A Loran installation at the northern coast of Alaska would immeasureably improve the navigation involved in the daily "Ptarmigan" flight from Barter Island to 85°N 143°38′W, then southwestward to 80°N on the 180 meridian and back to Pt. Barrow. This track is flown each day or night of the year (1500 successful flights have been completed, all without incident) to obtain weather information to be relayed globally. The accuracy of these reports may be improved by Loran which permits better fixes of position. The navigators and meteorologists of the 58th Weather Reconnaissance Squadron are working on a solution to the puzzling fact that the gradient wind obtained by the two methods do not always agree. *Subject Headings:* **1. Arctic flights 2. Loran installation 3. Arctic.**—*W.N.*

8.1–34 551.524.36(98)

*Court, Arnold and Parmele, Owen S., **Low temperature expectancy in northern North America.** *U. S. Quartermaster Corps. Research and Development Branch. Environmental Protection Section, Memorandum Report*, No. 14, Nov. 24, **1947.** 3 p. figs., 7 tables. **DWB**—

Tables give average number of days with minimum temperature at or below indicated values (−70°, −65°, −60° . . . +40°F) for each month, Nov.–March, for 18 stations in interior of Alaska, Yukon Territory, N.W. Territory and N.E. (Arctic) Canada. Monthly and seasonal frequency of days when temperature fell below −40° and −30°F are given for Fairbanks and Churchill for each winter 1929–30 through 1944–45. Stations are located on map and data given in table on coordinates and inventory of records (1927–45) used. Brief discussion. *Subject Headings:* **1. Extreme low temperature frequencies 2. Temperature extremes 3. North American Arctic 4. Alaska.**—*M.R.*

SOCIETIES

See also: **Sci. societies** (Cohen et al.), 8.1–57.

8.1–35 551.5:061.2

†Sonnblick-Verein, Vienna, **Jahresbericht, Vol. 49/50, 1951, 1952.** [Annual report of the Sonnblick Society, Vol. 49/50, for 1951 and 1952.] Vienna, **1954.** figs., tables, list of publications p. 64–66. **DLC**—This report of the Sonnblick Society contains a dozen articles, most of them dealing with results of observations of precipitation, snow cover, avalanches, glaciers, etc. in the Sonnblick area and in other Alpine regions (for contents of the report, *see M.A.B.*, 7(6):796, June 1956). A report of activities (1951/1952), a list of publications since 1938 (comprising some 60 papers published by members of the Society), the statutes of the Society, and a table giving monthly pressure, temperature, cloudiness, precipitation, sunshine duration, wind and other values (1951, 1952) for Sonnblick Peak (3106.5 m) are added. *Subject Headings:* **1. Annual society reports 2. Sonnblick Society. I. Steinhauser, F.** (*ed.*).—*G.T.*

8.1–36 551.5:061.2(438)

Z działalnósci Polskiego Towarzystwa Meteorologicznego i Hydrologicznego. [Activity of the Polish Meteorological and Hydrological Society in 1954.] *Przegląd Meteorologiczny i Hydrologiczny*, Warsaw, 8(2):186–188, **1955. DWB, DLC**—Progress report for 1954: List of board officers and heads of local branches, list of most important studies and investigations carried out during the year, list of papers prepared by and read at meetings of the various local branches of the Society. *Subject Headings:* **1. Polish Meteorological and Hydrological Society 2. Poland.**—*A.M.P.*

OBSERVATORIES

8.1–37 523.7 537.59 621.396.8:522

†Carnegie Institution of Washington, **Yearbook, No. 54, July 1, 1954/June 30, 1955.** Wash., D. C., **1955.** 311 p. figs., tables, bibliogs. **DWB**—Reports of departmental activities and cooperative studies: **Mount Wilson and Palomar Observatories,** p. 3–38, 3 tables, bibliog., p. 36–38. **Department of Terrestrial Magnetism,** p. 41–94, 17 tables, bibliog. p. 91–94. Solar research (photography, sunspot and magnetic studies, and solar spectrum investigations) at Mount Wilson and other observatories is outlined. Work in radio astronomy of Jupiter, the sun, and galaxies and ionospheric effects on radio frequency radiation is described. Cosmic ray investigations (by S. E. Forbush) are summarized. *Subject Headings:* **1. Astrophysical research 2. Radio astronomy 3. Cosmic ray research 4. Yearbooks.**—*M.R.*

8.1–38 523.7:628.8

Watanabe, Kaname, **Plan for air conditioning of Norikura Solar Coronal Observatory.** *Seppyo* (*Snow and Ice*), Tokyo, 13(3):75–81, **1951.** diagrs., tables, eqs. In Japanese. **DWB**—International Observatory at 2910 m on mountain in Central Japan. Building is open to south, and to the north it is built against the slope. Meteorological measurements of heat characteristics were made under different conditions. Fuel consumption was investigated under severest conditions (−25°C, wind 20 m/sec from WNW). Photos and diagrams show plan of observatory. *Subject Headings:* **1. Astrophysical observatories 2. Air conditioning 3. Norikura Mt., Japan.**—*M.R.*

SERVICES

See also: **Hungarian met. Service, 8.1–1; Met. observations, Bohemia** (Seydl), 8.1–59; **Marine Div. Brit. Met. Off.** (Frankcom), 8.1–74.

8.1–39 551.5:629.13:06

U. S. Weather Bureau, **Panel discussion on aviation weather service, held at the 35th Annual meeting of the American Geophysical Union, in Washington, D. C., May 3, 1954.** Wash., D. C., Sept. **1954.** (Jerome F. Lederer, moderator.) 40 p. **DWB**—The most pressing problems concerning military airlines and private (or commercial) pilots in the U. S. and their relations with the U. S. Weather Bureau are thoroughly discussed by Dr. REICHELDERFER (Chief, U.S.W.B.), Col. CHAVASSE (U. S. Air Weather Service), J. F. LEDERER (Director, Flight Safety Foundation) and other representatives (CAA, Navy Aerology, airlines, etc.) interested in flight safety. The commercial or private pilots are most in need of briefing and get the least service. Attempts at solving problems are being made. Forecasts, briefing, pilot reports, observations, facilities at subsidiary airports, etc., are among the services discussed. *Subject Headings:* **1. Aeronautical meteorological services 2. U. S. Weather Bureau 3. Commercial pilots. I. Lederer, Jerome II. Reichelderfer, F. W.**—*M.R.*

8.1–40 551.5:061.1

U. S. Weather Bureau, **Organization charts.** Jan. 1, **1954.** 51 p. 21″×17″. **DWB**—This atlas size publication shows the general organization of the U. S. Weather Bureau and the details of the organization within each division and section, the names of the heads of the divisions, their job descriptions, and the statistics of the personnel at each station in the network as well as at the Central Office. *Subject Headings:* **1. U. S. Weather Bureau 2. Organization charts 3. Networks 4. United States.**—*M.R.*

8.1–41 551.5:061.1

U. S. Weather Bureau, **The Weather Bureau at work.** Wash., D. C., **1954.** 11 p. photos. Price: **$.10. DWB**—A nontechnical account of the Weather Bureau and its main activities which affect the public—especially the forecast, flood warning and climatological services. The pamphlet is well illustrated. *Subject Headings:* **1. Meteorological services 2. U. S. Weather Bureau.**—*M.R.*

8.1–42 550.3:061(46) 551.5:061(46)

Spain. Instituto Nacional de Geofisica, **Personal técnico del Instituto en enero de 1955.** [Technical staff of the National Institute of Geophysics in Jan. 1955.] *Revista de Geofísica*, Madrid, 14(53):61–65, Jan./March **1955. DWB, DLC**—Lists director and staff: section of Pure Geophysics (3 members); section of Applied Geophysics (9); Pure Meteorology (3); Applied Meteorology (3); Radioactivity (5); Radiophysics (1); Radiochemistry (2); Radiobiology (4); Collaborators at Ebro Observatory (2); Cartuja Observatory (1); Santiago Observatory (1) and other collaborators (6). *Subject Headings:* **1. Spain. National Institute of Geophysics 2. Geophysical institutes.**—*M.R.*

8.1–43 551.5:061.6

Viaut, A., **L'activité météorologique en France de 1951 à 1953.** [French meteorological activity, 1951–1953.] *I.U.G.G. Bulletin d'Information*, 3(6):248–257, July **1954. DWB**—A long and detailed report on work of the Météorologie Nationale and various research establishments, namely: scientific expeditions (Greenland, Adélie Land, Kerguelen, and Amsterdam Island), University of Paris and Institut de Physique du Globe, National Radioelectricity Laboratory, Agroclimatological Research Stations (Versailles and Montpellier). A list of 13 periodicals is appended; annual bibliographies are said to be found in the section of meteorology in the *Comité National Français de Géodésie et Géophysique, Comptes Rendus* for each year. *Subject Headings:* **1. French meteorological research 2. France.**—*M.R.*

8.11–44 551.5:061(771) 551.509:621.39

Burke, H. N. (*U. S. W. B., Cleveland*), **Weather 1-1212.** *The Clevelander*, Cleveland, Ohio, 29(8):8, 34–35, Dec. **1954.** photo. **DWB**—The service to the public at Cleveland

(a District Forecast Center) is described and illustrated. New developments such as facsimile maps, telephone and teletype weather service to the public, TV broadcasts, disaster network, cloud seeding and the weather peculiar to Cleveland and the edge of the Great Lakes are discussed by the new chief at this important station. *Subject Headings:* **1. Local weather services 2. Cleveland, Ohio.**—*M.R.*

CONFERENCES AND SYMPOSIA

See: **Symposium on Artificial Rain,** 8.1–3; **Conference on the Scientific Basis of Weather Modification Studies,** 8.1–5; **WMO. Comm. for Synoptic Met. Conference,** 8.1–27; **ICAO and FAO Conferences,** 8.1–29.

EDUCATION, HISTORY AND BIOGRAPHY

See also: **Who's afraid of thunder?** (Sandman), 8.11–13.

BIOGRAPHY

See also: **WMO publications,** 8.1–30; **Met. observations, Bohemia** (Seydl), 8.1–59.

8.1–45 551.579:92

Samoĭlov, I. V., **Professor B. A. Apollov [Biography].** *Meteorologiia i Gidrologiia,* Leningrad, No. 4:59–60, July/Aug. **1955.** photo. **DWB**—Summary of the academic and professional career and the scientific contributions to hydrology of the Soviet hydrologist B. A. Apollov. *Subject Headings:* **1. Biography 2. Hydrologists 3. Apollov, B. A.**—*I.L.D.*

8.1–46 551.5(26):92

White, A. D., **Retirement [of] Commander M. Creswell, R.N.R.** *Marine Observer,* 26(173):166–167, July **1956. DLC**—Retired from the post of Port Meteorological Officer at Liverpool in June 1956 after nearly 32 years service. He went to sea in 1907, war service 1914–18 and Canadian Pacific 1919–24, joining the Meteorological Office in 1924. He is taking up the post of Merchant Navy Agent in the Humber. *Subject Headings:* **1. Biography 2. Creswell, M.**—*C.E.P.B.*

8.1–47 551.5:92

Réthly, Antal, **Emlékezés Fraunhoffer Lajosra születésének 90. évfordulóján.** [Commemoration of the 90th anniversary of the birth of Lajos Fraunhoffer.] *Időjárás,* Budapest, 59(2):116–119, March/April **1955.** photo. **DWB**—Fraunhoffer (1889–1947) was one of the pioneers, and for a long time a deputy director, of the Hungarian Meteorological Institute. Outstanding among his publications is a climatological monograph on temperature conditions of Hungary which he wrote in collaboration with Z. Róna and which, perhaps, is the most outstanding classic of Hungarian meteorological literature. *Subject Headings:* **1. Biography 2. Fraunhoffer, Lajos.**—*G.T.*

8.1–48 551.5:92

Konček, M., **Doc. Dr. Alois Gregor šesťdesiatnikom.** [Prof. Dr. Alois Gregor, hexagenarian.] *Meteorologické Zprávy,* Prague, 5(4):90, **1952.** port. **DLC**—Outline of the scientific career of A. Gregor, president of the Meteorological Institute at Prague University. Dr. Gregor worked at the State Meteorological Institute of Czechoslovakia for over 30 years; he became head of its climatological section and later its director (1945), holding the latter post until his assignment to the university chair. His scientific contributions have been mainly in the fields of climatology and bioclimatology. *Subject Headings:* **1. Biography 2. Gregor, Alois.**—*G.T.*

8.1–49 551.5:92

Korhonen, V. V., **Risto Sakari Jurva: in memoriam.** *Geophysica,* Helsinki, 5(2):53–57, **1956.** photo. **DLC**—Director of Marine Research Institute in Helsinki. Born July 1, 1888

in Vaasa; died Dec. 8, 1953. Appointed to Central Meteorological Office at Helsinki in Feb. 1908, retired in Dec. 1911. Assistant at Marine Research Institute, Helsinki in 1918, Chief of Division in 1938 and Director in 1947. Engaged in forecasting and research on thunderstorms, auroras, three-dimensional analysis, etc. at the Meteorological Institute. *Subject Headings:* **1. Obituaries 2. Biography 3. Jurva, Risto Sakari.**—*M.R.*

8.1–50 551.5:92

Dr. Władysław Miłata. [Announcement of his death.] *Przegląd Meteorologiczny i Hydrologiczny*, Warsaw, 8(2):169, **1955. DWB, DLC**—Announcement of the death at Krakow on Dec. 25, 1954 of the head of the Climatological Department of Krakow University. Dr. Miłata was a member of the Polish Meteorological and Hydrological Society. *Subject Headings:* **1. Obituaries 2. Miłata, Władysław.**—*A.M.P.*

8.1–51 551.5:92

Gregor, A., **K sedmdesátinám prof. PhDra Rudolfa Schneidera.** [On the seventieth anniversary of Dr. Rudolf Schneider.] *Meteorologické Zprávy*, Prague, 5(1):1–2, **1952.** port. Also his: **Za profesorem Dr Rudolfem Schneiderem.** [Obituary: Prof. Dr. Rudolf Schneider.] *Ibid.*, 8(6):164–165, **1955.** port. **DLC**—Biographical notes on R. Schneider (1881–1955), first head of the Czechoslovak Meteorological Institute in Prague (1919–1944) and professor of meteorology and climatology at Prague University. His principal contributions to meteorological literature were textbooks aimed at the popularization of meteorology. *Subject Headings:* **1. Obituaries 2. Schneider, Rudolf.**—*G.T.*

8.1–52 551.5:92:378.2

Weather Bureau veteran awarded honorary degree. *American Meteorological Society, Bulletin*, 36(8):420, Oct. **1955. DWB**—Ivan R. Tannehill was awarded the honorary degree of Doctor of Science by Denison University. *Subject Headings:* **1. Honorary degrees 2. Tannehill, I. R.**—*I.L.D.*

BIBLIOGRAPHY–INDEXES–TERMINOLOGY

See also: **Bibliog. of WMO publications,** 8.1–30; **Pressure pattern flying** (U. S. Air Weather Serv.), 8.1–91; **Forest management** (Curtis), 8.1–352.

8.1–53 551.5:91:05(061.2):439.8

Geografisk Tidsskrift, [Copenhagen], **Inholdsfortegnelse, 1931–1950.** (Index, Vol. 34–50, 1931–1950.) Bound in its issue, V. 54, **1955.** 94 p. (separately paged). **DWB**—The combined geographical and subject indexes are arranged in alphabetical order for Vol. 34–50, 1931–1950. Names of authors and titles of papers may appear several times under different headings. Items of meteorological interest are listed under the following subject headings: geology (5), glaciology (8), Greenland (22), oceanic currents (5), hydrography (7), inland ice (3), ice (4), climatology (10) and meteorology (22). *Subject Headings:* **1. Indexes 2. Periodical indexes 3. Geografisk Tidsskrift, Copenhagen. I. Jacobsen, N. Kingo** (*comp.*). —*W.N.*

8.1–54 551.46:016(26)

†Terry, Richard D., **Bibliography of marine geology and oceanography California Coast.** *California. Div. of Mines, Special Report*, No. 44, Aug. **1955.** 131 p. **DWB**—An author bibliography of about 2500 unannotated references (1835–1954) to literature on physical oceanography and marine geology of the California coast. A good subject index occupies half of the volume. However, the headings are so broad (e.g., waves, currents, dredging, geology, evaporation, Bay Bank, beach, etc.) that scores or even hundreds of items are listed under each heading, without subdivisions. A list of over 100 other bibliographies on the subjects or area concerned is appended. *Subject Headings:* **1. Oceanography bibliographies 2. Marine meteorology bibliographies 3. California Coast.**—*M.R.*

8.1–55 551.578.4:016 551.525.5:016

†U. S. Snow, Ice and Permafrost Research Establishment, **Bibliography on snow, ice and permafrost, with abstracts: Cumulative Index, Vols. 1–8.** Its *SIPRE Report*, No. 12, Cumulative Index, Sept. 1955. 55 p. **DLC**—Compilation of subject headings [with item numbers] assigned to SIPRE Abstracts 1–11,500. Supersedes the subject portion of the cumulative index pub. in Vol. 6, SIPRE Report No. 12. A useful subject index. (For other abstracts on this title, *see* 6A–36, Jan. 1955 and 7G–3, July 1956, *MAB*.) *Subject Headings:* **1. Snow and ice bibliographies 2. SIPRE Bibliography 3. Subject indexes.**—*M.R.*

8.1–56 551.311.18:001.4 551.311.18:551.509.1

Barlow, E. W., **The International Ice nomenclature.** *Marine Observer*, 26(173):149–150, July 1956. *Also:* Rodhe, Bertil, **The Baltic Ice Code.** *Ibid.*, p. 151–153. 6 photos. **DLC**—Barlow summarizes and briefly discusses the IMO and WMO discussions which led to an abridged ice nomenclature for the use of seamen. Rodhe describes the ice information service maintained by Baltic countries, the Baltic Hydrological Conference, and the 1954 code for Character and Development of the Ice and Effect on Navigation. *Subject Headings:* **1. Sea ice terminology 2. Sea ice codes.**—*C.E.P.B.*

HISTORY

See also: **Aerodynamics** (von Kármán), 8.1–8.

8.1–57 061.2

Cohen, John; Hansel, C. E. M. and May, Edith F. **Natural history of learned and scientific societies.** *Nature*, London, 173(4399):328–333, Feb. 20, **1954.** 3 figs., 3 tables, 2 refs. **DWB**—Summarizes methods of origin of societies, annual number since 1780 (only societies existing in 1952) and foundations, membership (total and per million population), trends in different sciences and other information. *Subject Heading:* **1. Societies.**—*C.E.P.B.*

8.1–58 551.506.8(09)

Seydl, Otto, **České práce fenologické starší doby.** [Early phenological studies in Bohemia.] *Meteorologické Zprávy*, Prague, 7(6):153–164, **1954.** bibliog. p. 160–164. Russian, English and German summaries p. 153. **DLC**—The author deals with the beginnings of phenological studies in Bohemia at the end of the 18th century and with the organization of phenological observations by the Patriotic Agricultural Society in Prague (founded in 1769) in the first half of the nineteenth. He pays tribute to the thorough work done by Karl Fritsch (1814–1879), from 1841 to 1851 assistant to Karl Kreil, director of Prague Observatory. A list of all writings of Fritsch is added. *Subject Headings:* **1. History of phenology 2. Bohemia, Czechoslovakia.**—*From author's abstract.*

8.1–59 551.5(09) 55:92

†Seydl, Otto, **K dwoustému výročí prvých měření meteorologických v Čechách.** [Two hundredth anniversary of meteorological observations in Bohemia.] *Meteorologické Zprávy*, Prague, 5(6):141–145, **1952.** port. 33 refs. **DLC**—In addition to a brief survey of the position of meteorology in early European university curricula, this paper contains a history of the life and work of Josef Stepling (1716–1778), first director of the astronomical observatory in Prague, who started regular meteorological observation in 1752. Stepling's immediate successor was A. Strnad who organized a meteorological network in Bohemia. *Subject Headings:* **1. History of meteorology 2. Biography 3. Stepling, Josef 4. Bohemia, Czechoslovakia.**—*G.T.*

8.1–60 551.5(09)(52)

Wadati, Kiyoo and Arakawa, Hidetoshi, **Brief history of meteorology and meteorological observation works in Japan.** *Journal of Geography*, Tokyo, 63(3):117–121, Sept. **1954.** ports. In Japanese. **DWB**—Article contains history and observations for over a century of the Society, the CMO, the *Journal of Meteorological Society of Japan* and photos of a dozen important meteorologists. *Subject Heading:* **1. History of meteorology 2. Japan.**—*M.R.*

APPLIED METEOROLOGY

OCEANOGRAPHY

See also: **Bibliog. marine geol. and oceanog.** (Terry), 8.1–54.

8.1–61 551.46:91

†Burke, C. J. and Elliott, Francis E., **Geographical study of the oceans.** (In: James . E. and Jones, C. F. (*eds.*), **American Geography.** Syracuse Univ. Press, **1954.** p. 410–426. g., 15 refs.) **DWB**—A general review of physical oceanography from the point of view of the eographer (who has usually confined his interests to land areas of the globe). After a brief eview of the dynamics of ocean currents; wind, swell and surf; water masses and undersea urrents and ecological aspects, the authors apply the regional concept of the geographers, eviewing the work of SCHOTT on the Atlantic, Pacific and Indian Oceans (*see* 5Λ–34 and 5Λ–25, an. 1954, *MAB*), and setting forth a new regional scheme based on temperature, salinity, urrents, pack ice and precipitation. A chart of the world shows these regions and their oundaries. In the text the average conditions in each region and other characteristics are escribed. A few practical applications of oceanography are outlined. *Subject Headings:* **. Regional oceanography 2. Oceanography for geographers.**—*M.R.*

8.1–62 551.46

Sverdrup, H. U. (*Dir. Norsk Polarinstitutt, Oslo*), **Oceanography.** (In: Kuiper, Gerard P. *ed.*), **The earth as a planet.** Chicago. Univ. of Chicago Press, **1954.** p. 215–257. 9 figs., tables, 23 refs., 43 eqs.) **DLC**—A concise but thorough summary of the most recent data nd information about the geography, geology, chemistry, density, optics, radiative balance, ddy viscosity, heat budget, evaporation, circulation at depths and in the surface layers, ind currents, interaction of sea and atmosphere, etc. Some of the charts and figures are rom **The oceans, their physics, chemistry and general biology** (1942) (*see* 5Λ–32, Jan. 1954, *MAB*) but some are original. *Subject Heading:* **1. Physical oceanography.**—*M.R.*

8.1–63 551.463:535.24

Burt, Wayne V. (*Johns Hopkins Univ., Chesapeake Bay Inst.*), **Distribution of suspended naterials in Chesapeake Bay.** *Journal of Marine Research*, New Haven, Conn., 14(1):47–62, **955.** 11 figs., 5 refs. **DWB, DLC**—The distribution of suspended materials in Chesapeake Bay and its tributaries, discussed in terms of light extinction, is characterized by marked ariability. There are large local time changes, a seasonal and tidal, as well as large horizontal radients. Variability in the suspended load results from varying distribution in the amount f suspended inorganic materials caused by wind mixing, tidal scouring and river discharge. Direct positive correlation between the amount of suspended materials and the diatom popula- ion was not found, though occasionally the influence of large diatom population appears in the ptical examination of raw water samples. *Subject Headings:* **1. Light extinction in sea 2. Sea urbidity 3. Chesapeake Bay.**—*Author's abstract.*

8.1–64 551.46:532.59(261)

Darlington, C. R., **The distribution of wave heights and periods in ocean waves.** *Royal Meteorological Society, Quarterly Journal*, 80(346):619 626, Oct. **1954.** 3 figs., table, 5 refs., qs. **DWB**—Water levels recorded with an instrument fitted to hull of an Ocean Weather hip in 53°N, 20°W are tabulated and analyzed. Mean height H_m 4–17 ft, "significant height" $H_{1/3}$, mean of highest third) 6–28 ft, H_{max} 42 ft. Values of $H_{1/3}$ and H_{max}, their standard eviations and periods are plotted against corresponding values of H_m and straight-line relations educed. *Subject Headings:* **1. Wave observations 2. North Atlantic.**—*C.E.P.B.*

8.1–65 551.463:535.24

†*Vercelli, Francesco, **La penetrazione delle radiazioni luminose nell' acqua di mare.** Penetration of luminous radiation in sea water.] *Italy. Comitato Talassografico Italiano, Memoria*, No. 271, **1939.** 32 p. tables, 27 refs. **DLC.** Also issued as: *Trieste. Istituto Geofisico, Pubblicazioni*, No. 125. **DWB**—Concerns theory of light penetration in water, iffusion, instrumental techniques (photometry), and recent photoelectric and photochemical

methods of submarine actinometry. Results at 4000–6600 Å obtained by several authors are tabulated and previous works critically reviewed. Recent results obtained in Italian seas are also tabulated for different colors of water (blue at Capri and green at Rovigno), and results obtained in lakes given for comparison. *Subject Headings:* **1. Submarine illumination 2. Color of sea water 3. Italy.**—*M.R.*

8.1–66 551.556:551.465

†Veronis, G. and Morgan, G. W., **A study of the time-dependent wind-driven circulation in a homogeneous, rectangular ocean.** *Tellus*, Stockholm, 7(2):232–242, May **1955.** 6 figs., 14 refs., 37 eqs. **DLC** A theoretical investigation of the ocean circulation induced by zonal winds whose amplitude varies harmonically with time is presented. The analysis is based on a perturbation scheme with respect to a small parameter which is essentially the frequency of the wind variation and the solutions are derived by boundary layer methods. Results are obtained for the variation of the intensity of the currents and their phase lag behind the wind, as well as for the deviation of the free surface from its equilibrium position. *Subject Headings:* **1. Drift currents 2. Wind driven currents 3. Oceanic circulation theory 4. Zonal wind stress on seas.**—*Authors' abstract.*

8.1–67 532.593:551.468

Bretschneider, Charles L. and Reid, R. O., **Modification of wave height due to bottom friction, percolation, and refraction.** *U. S. Beach Erosion Board, Technical Memorandum*, No. 45, Oct. **1954.** 36 p. 5 figs., 5 plates, 9 tables, 10 refs., 38 eqs. **DWB**—One of the more important phases of the study of the effects of waves on the shore is the modification of the wave trains as they approach the shore through shallow water. This report is on a theoretical investigation of the transformation (including energy loss) of waves in shallow water by bottom friction, percolation, refraction, and shoaling. Using the dissipation functions introduced by PUTNAM and JOHNSON (1949) and PUTNAM (1949), derived from the theory of progressive oscillatory waves of small amplitude, a general solution of the steady state energy equations is obtained. This solution avoids the tedious process of successive approximations but does involve numerical integration for complex situations of bottom topography. For the case of a bottom of uniform slope and the case of a bottom of constant depth, the solutions are presented in convenient graphical form. The graphs make it possible to obtain the reduction due to friction or percolation for any bottom slope, depth, initial wave height or wave period, assuming the friction factor and permeability coefficient for the bottom are known. The use of the graphs is illustrated by checking the examples given by PUTNAM and JOHNSON (1949). An example which involves refraction is also presented. *Subject Heading:* **1. Shallow water wave theory.**—*Author's abstract.*

8.1–68 551.556:551.526.6(261)

Sparger, C. R. (*Dept. of Oceanog., Texas Agri. and Mech. College, College Station*), **Relationship between wind and heat change observed in a vertical column of the sea.** *American Geophysical Union, Transactions*, 36(5):775–778, Oct. **1955.** 2 figs., table, 2 refs. **DWB, DLC**—Few satisfactory conclusions have been reached as to the influence of the atmosphere on short-term heat changes in the sea. This paper reports a simple, empirical result in this regard, the rationalization of which may prove profitable. Direct comparison has been made of certain local heat changes observed in the sea and wind stresses computed from observed velocities. Data used are those gathered by ocean-station vessels occupying COCA (52°45′N, 35°30′W) during the autumn months of 1947 and 1948. No apparent relationship existed between the local wind stress and the heat change occurring either within the mixed layer or, separately, below the mixed layer. But there seemed to be a connection between the cumulative effect of wind stress acting during one week and the total heat-change in a 600-ft column of the sea the following week. For each year studied it was possible to find a direction such that the components of the individually observed winds in that direction varied in sign exactly as the heat-change. The directions were different for the two years. A significant correlation was found to exist between the magnitude of the appropriate component of wind stress and the heat-change, having taken the lag into account. *Subject Headings:* **1. Wind effects on sea temperature 2. North Atlantic.**—*Author's abstract.*

8.1–69 535.37(26)

Phosphorescence [in] Indian Ocean, South Pacific Ocean, New Zealand waters [and] Eastern Pacific Ocean. Phosphorescent wheel [in] Gulf of Aden. *Marine Observer*, 26(173): 136–138, July **1956. DLC**—On July 25, 1955, in 7°45′N, 72°37′E and Sept. 9, 1955, in 5°19′N, 58°40′E a remarkable type of phosphorescence was observed rising to the surface and spreading out suddenly. Descriptions are also given of flashes, patches or "lumps" of phosphorescence in the equatorial Indian Ocean, South and East Pacific and New Zealand waters. On Sept. 6, 1955, in the Gulf of Aden, a series of alternations between parallel phosphorescent beams and a phosphorescent wheel rotating from a point on the horizon were seen. *Subject Heading:* **1. Phosphorescence.**—*C.E.P.B.*

8.1–70 551.482:532.72

Maximon, L. C. and Morgan, G. W. (both, *Brown Univ.*), **Theory of tidal mixing in a vertically homogeneous estuary.** *Journal of Marine Research*, New Haven, Conn., 14(2):157–175, Oct. **1955.** 3 figs., 5 refs., 61 eqs. **DWB, DLC**—An equation is derived for the distribution of a solute in an estuary where river flow and tides are predominant factors and where the dynamics and mixing can be described by a simple physical model. This model is subsequently generalized in various ways and it is found that the basic form of the diffusion equation is unchanged. An equation is derived which allows for time dependence of the various quantities involved and for introduction of a solute into the estuary by an external agent. Some solutions of this equation are studied. *Subject Headings:* **1. Tidal mixing 2. Diffusion equations 3. River flow.**—*Authors' abstract.*

8.1–71 535.4:551.463

Lenoble, J., **Angular distribution of submarine daylight in deep water.** *Nature*, London, 178(4536):756–757, Oct. 6, **1956.** 2 figs., table, 4 refs. **DWB**—Poole's assumption of isotropic scattering of light by sea water is replaced by one of a large forward scattering, which gives much better agreement with observations. *Subject Heading:* **1. Light scattering in sea.**—*C.E.P.B.*

8.1–72 551.48(05)

Acta Hydrophysica, Berlin, V. 1, No. 1, **1953**—Latest issue seen, 3(3), **1956.** irregular (about 4 nos. per fol. vol.). Editors, H. Ertel and J. Fischer. Issued by the Institut für Physikalische Hydrographie of the Deutsche Akademie der Wissenschaften in Berlin. Price varies per issue, from 5 Dm to 14 Dm, from the Akademie, Mohrenstrasse 39, Berlin W8, Germany. **DLC**—This new serial, begun in 1953, is a revival of the old traditional Akademie-Verlag publications such as *Gerlands Beiträge* or the *Beiträge zur Physik der freien Atmosphäre*, though not on so grand a scale as the above. The subject matter is physical and chemical oceanography, limnology, hydrography and pure hydrodynamics, with emphasis on the scientific, but not neglecting the applied aspects of these subjects. The first 3 volumes (4 issues each) contain at least 20 articles, all in German, on subjects of interest to meteorologists (e.g., albedo of oceans and lakes, wave and wind relations, radiation and temperature in water, etc.). (For contents, *see* p. 122 of this issue of *MAB.*) *Subject Headings:* **1. Hydrophysics 2. Serial publications. I. Akademie der Wissenschaften zu Berlin. Institut für Physikalische Hydrographie II. Ertel, Hans** (*ed.*) **III. Fischer, Johannes** (*ed.*).—*M.R.*

MARINE METEOROLOGY

See also: **Precip. at sea** (Skaar), 8.1–20; **World's weather,** 8.1–124.

8.1–73 551.584.6:629.123

Rodewald M. and Bullig, H.-J., **Die Laderaum-Meteorologie.** [Hold meteorology.] *Wetterlotse*, Hamburg, No. 104/105:1415–168, Aug. **1956.** 5 figs. **DLC**—Sweating in ships' holds and damage to cargoes by condensation has been a problem for centuries. The main factors are sea and air temperature, temperature and water content of cargo and weather at time of loading, but radiation, biological reactions of vegetable cargoes, etc. also enter in. Sweating occurs when a cold cargo is taken into a warm moist climate, or when temperature

in a warm moist hold falls. Examples of when and when not to ventilate are discussed. Charts of air and water temperature each month on a voyage home from W. Africa show danger zones of sweating due to cold sea, and of Atlantic and African routes show conditions in May. Ventilation charts are given for wool and wood in terms of air temperature and relative humidity. Ventilation should not be too vigorous, but should be thorough. *Subject Heading:* **1. Ships' hold climates.**—*C.E.P.B.*

8.1–74 551.5:061.1(26)(410)

Frankcom, C. E. N., **Work of the Marine Division of the British Meteorological Office and the Voluntary Observing Fleet during the year ended 31st March, 1956.** *Marine Observer*, 26(173):124–131, July **1956.** fig., 4 tables. **DLC**—Work is described of about 500 selected ships and 200 others, and of British Ocean Weather Ships. A number of special investigations have been published or are in hand. *Subject Headings:* **1. Marine meteorological services 2. British Meteorological Office.**—*C.E.P.B.*

8.1–75 551.582(265, 268):656.61

Great Britain. Hydrographic Dept., **Bering Sea and Strait Pilot. Comprising the northwestern and northern coasts of Alaska from Cape Douglas to Demarcation Point, the northern coast of Canada from Demarcation Point to Cape Bathurst, the Aleutian Islands, and the north-eastern coast of Siberia from Mys Shipunskiy to Mys Otto Shmidt.** 3d ed. London, **1954.** 53+634 p. 79 plates, tables. **GB-MO**—Meteorology p. xxxviii–liii. Climate p. 73–110 with the usual climatic tables for coastal stations. *Subject Headings:* **1. Sailing directions 2. Climatology 3. Bering Sea 4. Alaska 5. Canada 6. Siberia.**

8.1–76 551.5:656.608(265)

Ozeki, K., **On relations between weather and disaster in adjacent Sea of Onahama, Pt. 1.** *Journal of Meteorological Research*, Tokyo, 7(9):574–580, Oct. **1955.** 11 figs., 3 tables, 2 refs. In Japanese; English summary p. 574. **DWB, DLC.** Also issued as: *Sendai, Japan. Central Meteorological Observatory, Bulletin of the Meteorological Society for Research of Tohoku District*, 9(1):52–58, Nov. **1955.** In Japanese; English summary p. 52.—The statistical relations between weather and disaster in adjacent sea of Onahama are investigated. From the analysis of data during the period 1950–1954, the following results are obtained. (1) The disasters occur frequently in Dec. and March, few in Sept., and they occur frequently at 4 a.m. and 9 p.m. (2) Many wrecked ships are fishing boats of 30 or 40 tons (3) Cyclones and fronts which cause ship disasters are within 1000 km of Onahama. In case of the Japan Sea low, however, few are wrecked within 500 km. (4) In the case of northerly wind, even breeze wind, boats are wrecked frequently, while in the case of southerly wind with speed below 10 m/s, boats are wrecked rarely. (5) The disasters at sea occur frequently during fine weather. *Subject Headings:* **1. Marine disasters 2. Shipwrecks 3. Weather conditions 4. Onahama Sea.**—*Author's abstract.*

8.1–77 551.509.1(26)(728)

Portig, Wilfried, **Ein deutscher Meteorologe berichtet aus seiner Arbeit in Mittelamerika.** [A German meteorologist reports on his work in Central America.] *Wetterlotse*, Hamburg, No. 104/105:168–174, Aug. **1956.** fig. **DLC**—The collection of ships' observations is very backward on the west coast of Central America; except for U. S. Fleet Weather Central broadcast from Balboa, only Honduras has an efficient synoptic service. A map shows sea observations reported to San Salvador in June 1956. Land winds are useless because of topography. Some forecasting rules are given. *Subject Headings:* **1. Ships' weather messages 2. Central America.**—*C.E.P.B.*

8.1–78 551.509(26):639.2

Prager, Erwin, **Ein offenes Wort, Herr Kapitän!** [A frank word, Captain!] *Wetterlotse*, Hamburg, No. 102/103:138–140, July **1956.** **DLC**—Chatty advice to captains of fishing vessels on how to use weather forecasts. Forecasters are experienced; they occasionally make

nistakes but they know best! *Subject Headings:* **1. Utilization of forecasts at sea 2. Fisheries veather forecasting.**—*C.E.P.B.*

8.1–79 551.5:656.08:656.61

Rodewald, M., **Schiffsunfall durch Wetterbesserung.** [Shipwreck through weather mprovement.] *Wetterlotse*, Hamburg, No. 101:101–105, June **1956.** chart. **DLC**—An unusual accident occurred on Sept. 20, 1956 when MS "Germania," North Sweden to Kiel, an aground when the low sun appeared under a heavy cloud, giving a blinding light. Synoptic hart given. *Subject Heading:* **1. Shipwrecks.**—*C.E.P.B.*

GLACIOLOGY

See also: **Atmos. circulation during latest glacial period** (Majdanowski), 8.1–321; **Quaternary studies, Skane, Sweden** (Tullström), 8.1–322.

8.1–80 551.583.2:551.311.12(829)

Brown, Richard, **The Ross glacier.** *Nature*, London, 178(4526):192–193, July 28, **1956. DWB**—The Ross Glacier in South Georgia was first surveyed by the German Transit of Venus Expedition in 1882–83, when it had been receding. In 1902 it had advanced greatly, but in 1951 it was back near the 1883 position. Movements of other glaciers in S. Georgia, possibly due to earthquakes, are discussed. *Subject Headings:* **1. Glacier variations 2. South Georgia.**—*C.E.P.B.*

8.1–81 551.311.12

Pal'gov, N. N., **Nekotorye itogi noveĭshikh issledovaniĭ lednikov Kazakhstana.** [Some results of the most recent investigations of Kazakhstan glaciers.] *Akademiia Nauk, SSSR, Izvestiia, Ser. Geograf.*, No. 4:47–54, July/Aug. **1954.** 2 figs., 4 tables. **DLC**—Kazakhstan glaciers in the mountains of Trans-Ili and Dzhungarsk Ala Tau, which feed numerous rivers utilized for irrigation and production of water power, are being investigated by a glaciological expedition of the Academy of Sciences. Main attention in the study is given to their hydrological regime and physical conditions—firn fields, buried ice (under lateral, medial and frontal moraines) and the tongue with its open surface. Preliminary results of the investigation dealing with the runoff of glaciers determined under various conditions of temperature, exposure, purity of ice and snow cover, duration of sun light, etc. are presented in tables and discussed. The glaciers are retreating and are decreasing in volume. Author assumes that this will stop when the glaciers reach a higher hypsometric position where they will be in the range of cooler summer air temperatures. *Subject Headings:* **1. Glacial runoff 2. Glacial ablation 3. Glacial structure 4. Kazakhstan, U.S.S.R.**—*A.M.P.*

8.1–82 551.311.12

Sauberer, Franz, **Zur Problematik der Gletscherschwankungen.** [On the problems of glacier variations.] *Sonnblick-Verein, Vienna, Jahresbericht*, 49/50:37–43, 1951–1952, pub. **1954.** 2 tables, 10 refs. **DLC**—Positive and negative factors affecting the glacier balance (precipitation, sublimation, freezing, ablation) and methods and problems of their measurement are discussed. It is found that the importance of a direct effect of solar radiation upon the state of glaciers has been overestimated, while the importance of albedo and its variations (due to impurities, changes in precipitation, etc.) has been neglected. The study of the radiation balance of glaciers requires extensive measurement of a variety of factors. *Subject Heading:* **1. Glacier variations.**—*G.T.*

8.1–83 551.5:551.311.12

[Studies of Lemon Creek Glacier by the Juneau Ice Field Research Project.] *Science*, Wash., D. C., 122(3159):112, July 15, **1955. DLC, DWB**—A preliminary report on the detailed studies of Lemon Creek Glacier (Alaska), and spot observations of nearby glaciers to obtain more information on the relationship between glacier behavior and weather. In-

vestigations will be made to determine if: 1) the greater accumulation of snow of this year will cause any of the receding glaciers to advance; 2) the heat exchange between the glacier and the air above it; 3) the state of alimentation and 4) its variations in the past to establish when it attained its maximum size. *Subject Headings:* **1. Weather effects on glaciers 2. Glacial ablation 3. Glacier nourishment 4. Lemon Creek Glacier, Alaska.**—*A.M.P.*

GEOMAGNETISM

8.1–84 519:550.3

Bartels, Julius (*Geophys. Inst., Göttingen Univ.*), **A table of daily integers, 1902–1952: seasonal, solar, lunar and geomagnetic.** Alaska. Univ. Geophysical Institute, Contract AF 19(604)-503, Scientific Report, No. 2, Dec. **1954.** 18 p. 13 refs. numerous tables. **DWB** -Tables of integers are given, characterizing each mean solar day from 1902 to 1952 inclusive, according to season (SN), sunspot activity (R), phase in the lunar month (L), the phase of the principal harmonic in the lunar tidal potential that depends on the variations of lunar distance (N), and the magnetic activity (A). The day to which the integers refer, except in the case of A, is the Greenwich day beginning 0^h UT (universal time); thus all the integers except A are appropriate for use in the reduction of geophysical data for any station whatsoever. The integers A refer to the day beginning at 3^h UT, and are appropriate for the magnetic classification of the magnetic data for Sitka. Some uses of these tables in the analysis of geophysical data are briefly indicated. *Subject Headings:* **1. Integers 2. Geophysical data analysis 3. Tables of constants.**—*Author's abstract.*

8.1–85 550.38

Grenet, G. (*Univ. of Algiers*); Kato, Yoshio; Ossaka, Justo and Okuda, Mitsunao (*Tohoku Univ., Sendai, Japan*), **Pulsations in terrestrial magnetic field at the time of bay disturbance.** *Tohoku. Univ., Science Reports, 5th Ser., Geophysics*, 6(1):1–10, Aug. **1954.** 10 figs., 3 refs. **MH-BH**—The rapid pulsations in terrestrial magnetic field are observed constantly at Tamanrasset Magnetic Observatory of Algiers University (Dir., G. Grenet) and Onagawa Magnetic Observatory of Tohoku University, Sendai, Japan (Dir., Y. Kato) by induction magnetographs. We found very interesting facts after comparing the data of dH/dt at the time of magnetic disturbances, obtained at these two observatories which are situated at nearly opposite sides of the globe. In this paper, we investigated the rapid pulsations which are observed at the time of bay disturbance, using the data of dH/dt, obtained at these two observatories. The results obtained from this investigation are as follows: The rapid pulsation of dH/dt at the time of bay disturbance is observed only at the initial part of disturbance and reduced to calm at the time when the amplitude of horizontal component reaches its maximum. The oscillation of dH/dt which is experienced at the time of bay disturbance begins always with positive ($dH/dt > 0$) everywhere in the world. The time of occurrence of the oscillation is same at both stations within the error of 0.1 minute and the mode or the phase of oscillation is also similar, though these stations are situated at nearly opposite sides of the globe. G. Grenet and Y. Kato discussed the mechanism of these rapid pulsations and concluded that these pulsations are caused directly by the corpuscular beam approaching the earth. *Subject Headings:* **1. Magnetic bay disturbances 2. Geomagnetic activity 3. Tamanrasset Observatory, Algeria 4. Onagawa Magnetic Observatory, Japan.**—*Authors' abstract.*

8.1–86 550.38.8

Meyer, Otto and Voppel, Dietrich, **Ein Theodolit zur Messung des erdmagnetischen Feldes mit der Förstersonde als Nullfeldindikator.** [A theodolite for measuring the geomagnetic field with the Förster tube as zero-field indicator.] *Deutsche Hydrographische Zeitschrift*, 7(3/4):73–77, **1954.** fig., 4 refs. German, English and French summaries p. 73. **DWB**—A theodolite at Wingst Observatory is described, which can be used for the vector of the magnetic field, and also the components separately. *Subject Heading:* **1. Magnetic instruments.**—*C.E.P.B.*

AERONAUTICAL METEOROLOGY

See also: **Aerodynamics** (von Karmán), 8.1–8; **Loran, polar regions** (Lee), 8.1–33; **Aviation met. services** (U. S. W. B.), 8.1-39; **Constant absolute vorticity trajectories in aviation forecasts** (Frank), 8.1–182; **Effect of pneumatic de-icers . . .** (Bowden), 8.1–275; **Weather and air traffic** (Regula), 8.1–308.

8.1–87 551.574.1:551.574.7:629.13

Brun, Rinaldo J., **Cloud-droplet ingestion in engine inlets with inlet velocity ratios of .0 and 0.7.** *U. S. National Advisory Committee for Aeronautics, Technical Note,* 3593, Jan. 956. 52 p. 15 figs., table, 8 refs., 22 eqs. **DWB, DLC**—The paths of cloud droplets into wo engine inlets are calculated. The amount of water in droplet form ingested by the inlets nd the amount and distribution of water impinging on the inlet walls are obtained from these roplet-trajectory calculations. In both types of inlet a prolate ellipsoid of revolution (10% hick) represents either part or all of the forebody at the center of an annular inlet to an ngine. The configurations can also represent a fuselage of an airplane with side ram-scoop nlets. The principal difference between the two inlets studied is that the inlet air velocity f one is 0.7 that of the other. *Subject Headings:* **1. Icing of aircraft 2. Drop impingement n aero engines.**—*NACA abstract.*

8.1–88 551.574.1:551.574.7:629.13

Brun, Rinaldo J. and Vogt, Dorothea E., **Impingement of water droplets on NACA 65A004 irfoil at 0° angle of attack.** *U. S. National Advisory Committee for Aeronautics, Technical Note,* No. 3586, Nov. **1955.** 28 p. 10 figs., 6 refs. **DLC**—The trajectories of droplets in the ir flowing past an NACA 65A004 airfoil at an angle of attack of 0° were determined. The mount of water in droplet form impinging on the airfoil, the area of droplet impingement, nd the rate of droplet impingement per unit area on the airfoil surface were calculated from he trajectories and presented to cover a large range of flight and atmospheric conditions. These impingement characteristics are compared briefly with those previously reported for the ame airfoil at angles of attack of 4° and 8°. *Subject Headings:* **1. Icing of aircraft 2. Drop mpingement on airfoil 3. Ice prevention removal 4. Ice removal.**—*NACA abstract.*

8.1–89 551.553.6:551.551:656.7

Coleman, Thomas L. and Fetner, Mary W., **An analysis of acceleration, airspeed, and ust-velocity data from a four-engine transport airplane in operations on an Eastern United States route.** *U. S. NACA, Technical Note,* 3483, Sept. **1955.** 20 p. diagrs., 3 tables. **DWB, DLC**—Time-history data obtained by the NACA VGH recorder from one model of a our-engine civil transport airplane during operations on an eastern United States route are nalyzed to determine the magnitude and frequency of occurrence of gusts, gust accelerations, nd the associated airspeeds. Comparison of the results with previously reported results ndicates the gust-load history to be more severe than for two other similar operations involving ther types of four-engine transports. The present airplane was operated in rough air at a igher percentage of its design speed than were the other airplanes and this condition was rimarily responsible for the more severe load history for the operation. *Subject Headings:* **. Gust loads 2. Aircraft operating problems.**—*NACA abstract.*

8.1–90 551.508:676.71 551.589.5:656.71

*Sperry Gyroscope Company, Inc., **Flight investigation of the performance of low ceiling/ isibility meteorological equipment.** Appendix prepared by United States Weather Bureau. Contract CCA 29773, Report, No. 5245-4059, Dec. **1954.** 113 p. numerous figs. incl. photos some fold.), tables (some fold.). **DWB**—Flight tests were conducted at MacArthur Field, 50 mi from New York City on Long Island with a DC-3 equipped with cross-wind landing gear nd standard flight instruments. The special equipment at the airport included: 1 trans-nissometer, 2 rotating beam ceilometers, 1 terrain illuminometer, 13 meteorological visibility argets, 13 visibility lamps and 28 runway visibility markers. Equipment, facilities, etc. are described and illustrated in great detail, and observations in air and on the ground correlated nd tabulated in extensive tables and graphs. Purpose of the tests was to evaluate the ceil-

ometer-transmissometer system of measuring low ceiling-visibility conditions for instrument landing, especially at the critical limits for 3 types: stratus overcast, radiation fog and snow. It was found that reported ceiling heights are, on the average, about 100 ft lower than contact height as observed from the plane; and reported visibilities greater than the threshold contact range, though deviations were not so great for fog or night conditions as for daytime overcast conditions. Comparisons were made between aircraft and end-of-runway transmissometer readings, showing better correlation than the station-aircraft measurements. Deviations between stations and end of runway observations were great—sometimes the extremes deviated more than the average value. Part of these deviations are due to actual conditions being different—part to the fact that the observer integrates around the horizon while the transmissometer measures over a specific 750 ft path. Additional analyses are available from U. S. Weather Bureau. *Subject Headings:* **1. Ceiling and visibility measurements 2. Aircraft landing aids 3. Aeronautical meteorology 4. Air-borne instruments 5. MacArthur Field, Long Island, N. Y. I. U. S. Weather Bureau.**—*M.R.*

8.1–91 551.542:629.13:016

†U. S. Air Weather Service, **Meteorological aspects of pressure pattern flight.** Its *AWS Manual* 345-1 (rev.), Dec. **1954.** 63 p. 19 figs., tables, eqs., bibliog. p. 59–63. **DWB**—A thorough review of the history and literature of pressure pattern flying and similar techniques (e.g., single heading, minimal flight path) and a practical exposition and illustration of theory and methods used and in-flight procedures, plus tables, graphs, charts and nomograms for actual use in planning and navigation. A very thorough bibliography is also appended. *Subject Headings:* **1. Pressure pattern flying 2. Aeronautical meteorology 3. Bibliography on pressure pattern flying.**—*M.R.*

8.1–92 551.509.1(02)

U. S. Weather Bureau, **Manual for aeronautical meteorological codes: Aero code, MMMMM/BBBBB Code, TAFOR Code, ROFOR Code, FIFOR Code, ARFOR Code.** Effective Jan. 1, **1955.** 61 p. 22 tables. **DWB**—Code manual for aeronautical use, recommended in 1953 by ICAO and WMO, and effective Jan. 1, 1955. All manner of special codes such as the AERO (abbreviated synoptic code similar to hourly sequence data), Special Code, forecast codes (terminal TAFOR, abbreviated terminal TAF, route forecast ROFOR, flight forecast FIFOR, and weather forecast for a stipulated area, ARFOR) are included. Manual contains codes, specifications for symbols and tables needed for use. *Subject Headings:* **1. International code manuals 2. Aeronautical meteorology codes 3. Manuals.**—*M.R.*

AGRICULTURAL METEOROLOGY

See also: **Soil met. investigations** (Peerlkamp), 8.1–15; **Hay drying** (Shepperson), 8.1–348.

8.1–93 551.525.4:631.95(439.1)

Batta, Erzsébet, **A talajhőmérséklet napi normálértékei és a vetési hőmérséklet.** [Daily normal soil temperature and planting temperature.] *Időjárás*, Budapest, 59(6):351–358, Nov./Dec. **1955.** 4 figs., 4 tables. Russian and German summaries p. 351. **DWB, DLC**—Values of daily normal and extreme soil temperature at depths from 2 to 400 cm are determined for Budapest for the 30-year period 1912–1941. A critical boundary layer is identified; annual extreme values of soil temperature propagate in opposite directions above and below that layer. The daily normals of soil temperature may be used in determining planting temperatures for the principal crops. *Subject Headings:* **1. Annual soil temperature variations 2. Crop ecology 3. Budapest, Hungary.**—*Trans. of author's abstract.*

8.1–94 551.5:63(44)

Brochet, P., **La météorologie agricole dans la région Nord.** [Agricultural meteorology in the North of France.] *La Météorologie*, Paris, Ser. 4, No. 36:456–461, Oct./Dec. **1954.** table. **DWB**—The organization and methods of operation of the Agricultural Meteorological Information Service established in 1948 for the north of France are described and discussed.

The first part of the paper discusses the best methods of gaining large circles of listeners and subscribers by coming in direct contact with farmer organizations and showing them the usefulness of such information. The second part deals with the nature of information provided: 1) weather elements and climatology and 2) weather forecasts—short range and extended. Pt. 3 deals with the transmission of information: 1) short-notice warnings by telephone to one or two correspondents in organization (who have to warn the area) and 2) normal information sent by mail or to organization meetings. *Subject Headings:* **1. Agricultural meteorology 2. Agrometeorological forecasts 3. Northern France.**—*A.M.P.*

8.1–95 551.525:633.11

Fuss, Franz, **Über die Entwicklung von Weizen in Abhängigkeit von der Bodentemperatur.** [Dependence of development of wheat upon soil temperature.] *Angewandte Meteorologie*, Berlin, 2(8):253–256, June **1956.** fig., 5 tables, 11 refs. **MH-BH**—Rate of development of winter wheat (at Dresden) is indicated by number of days between beginning of year and appearance of first leaf, between first and second leaf, between Jan. 1 and end of haulm growth, and length of haulm. The number of days for each stage is inversely related to soil temperatures at 2 and 5 cm depth. *Subject Headings:* **1. Soil temperature effects 2. Wheat growth 3. Dresden, Germany.**—*C.E.P.B.*

8.1–96 551.578.4:633

Kusakabe, M. (*Central Met. Observ., Tokyo*), **Snow damage of wheat and barley (Agrometeorological study on the locality of the crop damage in Japan, Pt. 10).** *Journal of Agricultural Meteorology*, Tokyo, 10(3/4):136–138, March **1955.** 3 figs., 3 refs. In Japanese; English summary p. 138. **DWB**—An agrometeorological study was made in Iwate Prefecture, as a sample of snow damage of wheat and barley. Towns and villages are classified by the frequency of bad harvest years (the yield of wheat and barley per acre decreased to less than 80% of normal crops) during 1918–1940. The locality of snow damage, based upon the yield (1918–1940). Hatching: The towns and villages, where the bad harvest years occur more than 30% in probability. Blacking: The towns and villages, where they cannot cultivate wheat and barley, because of deep snow. Fig. 3 shows the locality of snow damage, based upon the agrometeorological data, or the frequency of the snowy winter (i.e., more than 120 snow covered days are observed). Hatching: The snowy winter occur more than 30% in probability. In these districts, wheat and barley are damaged by snow very often. Blacking: The snowy winter occur more than 50% in probability. In these districts they cannot cultivate wheat and barley. *Subject Headings:* **1. Snow damage to crops 2. Grain crops 3. Iwate Prefecture, Japan.**—*Author's abstract.*

8.1–97 551.586:636.3(943)

Macfarlane, W. V.; Morris, R. J. and Howard, B., **Water economy of tropical merino sheep.** *Nature*, London, 178(4528):304–305, Aug. 11, **1956.** table, 3 refs. **DWB**—At Julia Creek, Queensland, 21°S, 142°E in a very hot sunny climate, water intake, respiration rate, body temperature and urine output were studied in 60 young merinos. Gradient between tip of 4 cm wool and skin was 45°C (87–42°); shorn sheep had skin temperature 3°C higher and panted more than twice as fast. Physiological changes after 120 hrs in the sun without water are tabulated. The sheep were unharmed. *Subject Headings:* **1. Tropical bioclimatology 2. Merino sheep 3. Queensland, Australia.**—*C.E.P.B.*

8.1–98 551.586:636.2:519.241.1(71)

Smoliak, S. and Peters, H. F. (both, *Range Experiment Station, Manyberries, Alberta*), **Climatic effects on foraging performance of beef cows on winter range.** *Canadian Journal of Agricultural Science*, 35:213–216, May/June **1955.** 3 tables, 4 refs. **DLC**—A study was made of the effects of climatic factors on foraging performance of beef cows at the Range Experiment Station, Manyberries, Alberta. The relationships among: (1) percentage of cows foraging daily on upland open winter range; (2) daily mean temperature in degrees F; (3) daily wind milage and (4) amount of supplemental feed given, were determined. A feeding index with a range of 1 to 4 was used, 1 indicating no supplemental feed given and 4 indicating

1½ lb of linseed oilcake and 15–20 lb roughage per head per day. Data were obtained on domestic cows of the Hereford, Shorthorn and Angus breeds, and Cattalo cows of half-bison and quarter-bison breeding, during Jan., Feb., and March, 1952. Covariance analysis revealed no significant difference between breeds in the degree of correlation for the characteristics studied. The combined gross correlation coefficients r_{12}, r_{13}, and r_{14} were 0.416**, −0.169**, and −0.162**. The partial correlation coefficients $r_{12.34}$, $r_{13.24}$, and $r_{14.23}$ were 0.382**, −0.088, and −0.086, and the corresponding regression coefficients were 0.778, −0.036, and −3.322. The regression was linear. The multiple correlation coefficient $r_{1.234}$ at 0.432 was not much higher than the coefficient $r_{12.34}$ at 0.382, indicating that temperature was the most important environmental factor studied. The Cattalo foraged on open range more frequently than the cows of domestic breeds. Also a greater proportion of Cattalo cows were out foraging as compared with cows of domestic breeds. ** Significant at the 0.01 level. *Subject Headings:* **1. Bioclimatology 2. Cows 3. Correlation coefficients 4. Alberta, Canada.**—*Authors' abstract.*

FOREST METEOROLOGY

See also: **Wind in front and back of shelter hedge** (Tanaka, Tanizawa), 8.1–253; **Forest management** (Curtis), 8.1–352.

8.1–99 551.571:551.588.6(432)

Mrose, Helmut, **Der Einfluss des Waldes auf die Luftfeuchtigkeit.** [The influence of forests on humidity of the air.] *Angewandte Meteorologie*, Berlin, 2(9):281–286, May **1956.** fig., 6 tables, 7 refs. **DLC**—Health resorts are often in forests. Here radiation, wind force, temperature range and evaporation are less than in the open. Mean temperature is slightly lower and humidity higher, as shown by observations inside and outside forest near Friedrichroda (50°52′N, 10°35′E) with a sling thermometer. The mean V.P. difference was <1 mm Hg but locally >1.8 mm and 35% relative humidity. The forest is more sultry than the open in summer. Some data are also given for a forest in lee-eddy cloud. *Subject Headings:* **1. Forest climatology 2. Friedrichroda, Germany.**—*C.E.P.B.*

8.1–100 551.578.46:551.556.2:551.588.6

Nakano, Kôkichi, **Bôsetsurin ni tsuite.** [Protection against snow damage by forests.] *Seppyo* (*Snow and Ice*), Tokyo, 13(1):12–18, July 1951. figs., table. In Japanese. **DWB**—Diagrams and data show effect of trees in increasing or decreasing depth of snow. *Subject Headings:* **1. Shelter belt effects 2. Snow protection by forests.**—*M.R.*

MEDICAL AND INDUSTRIAL METEOROLOGY

See also: **Medical-met. forecast** (Kuhnke), 8.1–4; **Ships' hold climate** (Rodewald, Bullig), 8.1–73; **Fisheries weather forecasting** (Prager), 8.1–78; **Biol. effects of infrared radiation** (Knepple), 8.1–224; **Statistics in bioclimatology** (Picko), 8.1–340.

8.1–101 662.2:539.1:398.3:551.5

Faust, H., **Über die Verbreitung des Glaubens an eine Wetterbeeinflussung durch Atomexplosionen.** [On the spreading of the belief in a weather influence of atomic explosions.] *Meteorologische Rundschau*, Berlin, 9(5/6):109–110, May/June **1956. DLC**—The question "Do you believe that disturbed weather is due to atom bombs, or not" was asked of 2134 people in Germany; 49% said "yes," 34% "no," 17% "no opinion." The answers are analyzed by age, occupation and income. *Subject Headings:* **1. Atomic explosion effects on weather 2. Popular beliefs.**—*C.E.P.B.*

8.1–102 551.54:612

Mills, Clarence A. (*Prof. Exp. Medicine, Cincinnati Univ.*), **Why the weather gets you down.** *Sunday Star Magazine Section, This Week Magazine*, Sept. 11, 16, 18, **1955.** photos. **DLC**—Although complicated by other factors, the general adverse effects (on human beings) associated with approaching storms are attributed to falling pressure which, according to the author, allows the tissues to absorb great quantities of water from the intestines, just as a

sponge absorbs water when squeezing (pressure) is relaxed. This extra moisture causes ankles or joints to swell and produces intra-cranial pressure and attending irritability. Other adverse effects are mentioned as well as beneficial effects of rising pressure. *Subject Headings:* **1. Pressure effects on humans 2. Weather and man.**—*M.R.*

8.1–103 551.510.53:629.12:612.275.1

Poppen, John R., M.D. (*Northridge, Calif.*), **Human aspects of navigation at high altitudes.** *Navigation*, Los Angeles, 4(3):114–117, Sept. **1954.** 6 refs. **DLC**—A general discussion on means of overcoming human biological limitations in high altitude flight. In particular the effect of reduced sky brightness and other optical difficulties are discussed. *Subject Headings:* **1. High altitude flying effects on man 2. High altitude optics 3. Biometeorology.**—*A.A.*

8.1–104 551.594.14:662:539.1

[Sutton, O. G.], **Thermonuclear explosions and the weather.** *Current Science*, Bangalore, 24(4):113, April **1955. DWB, DLC**—Poor weather in the British Isles and in Western Europe in the summer of 1954 was attributed by some to the U. S. atomic energy experiments earlier that year. O. G. SUTTON concludes that both climatological and aerological evidence is unfavorable to the theory that the tests affected European weather. All occurrences in 1954 fall well within established climatic range so that it is impossible to prove that the "sequence" was one of cause and effect. *Subject Heading:* **1. Thermonuclear explosion effects on weather,** —*M.R.*

8.1–105 551.571:699.86

*Cammerer, J. S., **Effect of moisture and heat transmission through building and insulating materials: a review of the international literature.** *National Research Council of Canada, Technical Translation*, TT-317, **1952.** 34 p. 8 figs., 18 tables, 11 refs. **DWB.** Translation by H. A. G. Nathan of original German, **Der Einfluss der Feuchtigkeit auf den Wärmeschutz von Bau- und Dämmstoffen nach dem internationalen Schrifttum.** *Wärme- und Kältetechnik*, No. 9:126–135, Sept. **1939.**—In order to develop practical values for the effect of moisture upon the thermal conductivity of building and insulating materials, the author culled all measurements available in the international literature. The discussion with accompanying data presented in tables covers the following: thermal conductivity in the dry state, effect of moisture upon the thermal conductivity of inorganic and organic materials and change in the effect of moisture on thermal conductivity at temperatures below 0°C. Some of the numerical data are also presented graphically. *Subject Headings:* **1. Building materials 2. Insulation 3. Humidity effects on materials. I. Nathan, H. A. G.** (*trans.*).—*I.L.D.*

8.1–106 551.582(422):551.586:628.8:519.241.1

Pallot, A. C., **The effect of weather conditions upon the fuel requirements of buildings.** *Institution of Heating and Ventilating Engineers, London, Journal*, 8(91):249–277, Sept. **1940.** 6 figs., table, 3 refs. **DLC**—Daily fuel consumption in 3 groups of buildings in London was correlated with weather elements at Kew. The closest correlation was with mean (24 hr) temperature, slightly higher than with day (9–18 h) temperature. Partial regression equations were calculated between consumption and 24 hr temperature and other elements singly. Minimum temperature is important, especially in mid-winter; maximum temperature is unimportant. Effect of wind is greatest in early winter. Consumption increased with increase of solar radiation, pressure and rainfall, and with decrease of humidity and cloud, but the general picture is very complex. *Subject Headings:* **1. Fuel requirements 2. Regression equations 3. Weather effects on fuel consumption.**—*C.E.P.B.*

8.1–107 551.58:6:681.177

U. S. Weather Bureau, **Selected examples of weather problems requiring statistical analyses of weather records.** [1955?] 1 p. (fold.). Also its: **How are statistical analyses of weather data used?** [1955?] 1 p. (fold.) illus. **DWB**—In the first article, 14 examples of how weather records, if properly compiled, could aid industry, engineers, farmers, etc. are cited to show advantages to be gained by use of punched card methods over present hand

tabulation methods. The illustrated display entitled: How are statistical analyses of weather data used?, shows 9 types of analysis of weather data to aid farmers, 5 for building industry, 7 for transportation, 6 for aviation, 4 for wholesale business, 4 for power utilities, 3 for insurance, 5 for construction in industry, 3 for water engineering problems and 2 for communications. *Subject Headings:* **1. Industrial climatology 2. Engineering design data processing 3. Punched card applications.**—*M.R.*

MATHEMATICS AND STATISTICS

See also: **Effects of certain filters on correlation** (Dedebant, Machado), 8.1–118.

8.1–108 517.512.2

Kobayashi, T. (*Inst. of Low Temperature Sci., Hokkaido Univ.*), **On the multi-harmonic analysis.** *Meteorological Society of Japan, Journal, Ser. 2,* 31(11/12):370–389, Dec. **1953.** tables, 3 refs., 11 eqs. **Pt. 2.** *Ibid.,* 33(2):68–75, March **1955.** fig., 4 tables, 8 refs., 7 eqs. **DWB, DLC**—Harmonic analyses for many terms are troublesome to perform by the ordinary scheme; in this paper the author shows that they are easily obtained by combining sets of simpler analyses. The second paper deals with the procedures to be taken for the case where the m and n are arbitrary integers, and gives an example of analysis for 12×12 terms schematically. *Subject Heading:* **1. Harmonic analysis.**—*Author's abstract.*

8.1–109 517.512.2:681.177

Munkelt, Karl, **Harmonische Analyse und Synthese mit Lochkartenmaschinen.** [Harmonic analysis and synthesis with punch card machines.] *Deutsche Hydrographische Zeitschrift,* 8(3):119–127, **1955.** 2 tables, 12 eqs. German, English and French summaries p. 119. **DWB**—The basic formulas of harmonic analysis are put in a suitable form and the technique of practical work set out. Synthesis is briefly described. The time for complete analyses is tabulated. *Subject Headings:* **1. Harmonic analyses 2. Punched card machines.**—*C.E.P.B.*

8.1–110 517.9:518.12

Garwick, Jan V., **The solution of boundary-value problems by step by step methods.** *Archiv för Mathematik og Naturvidenskab,* Oslo, 52(8):95–161, **1955.** tables, 8 refs., eqs. **DLC**—Application of an iterative process to equations which satisfy boundary conditions at two different points is described. First a set of simple linear algebraic equations is solved, and then more complex problems and ordinary linear differential (i.e., difference) equations with given boundary values. Pt. 5 deals with eigenvalue problems, defined as homogeneous equations with homogeneous boundary values and one variable parameter. Pts. 6 and 7 deal with non-linear differential equations and partial differential equations. No specifically meteorological examples are included. *Subject Heading:* **1. Boundary value problems.**—*C.E.P.B.*

RADIO ASTRONOMY

8.1–111 522.1:621.396.8

Kraus, John D., **Radio telescopes.** *Scientific American,* N. Y., 192(3):36–43, March **1955.** 14 figs. (incl. photos). **DLC**—Radio "sight"-telescopes open up to us a much greater range of space than we are able to explore. Resolution of radio telescopes is expressed in terms of beam-width—the sharper the beam—the better the resolution. The function of the antenna is to focus the incoming radio wave at one point. Radio telescopes at Boulder, Colo., by National Bureau of Standards; at Washington by the Naval Research Laboratory, and the one under construction at Manchester, Eng. (with a reflector of 250 ft across), as well as other types of telescopes are described. One consisted of 600 dipoles above a 1500 ft long reflector made of chicken wire (near Sydney, Australia). *Subject Heading:* **1. Radio telescopes.**—*A.M.P.*

8.1–112 621.396.8:522(061)

Smith-Rose, R. L., **International research in radio astronomy.** *Nature,* London, 176(4493):1110–1111, Dec. 10, **1955.** 3 refs. **DWB**—Summary of special reports 3–5 of the

International Scientific Radio Union: 3) Discrete sources of extra-terrestrial radio noise; 4) Distribution of brightness on the solar disk; 5) Interstellar hydrogen. *Subject Heading:* **1. Radio astronomy.**—*C.E.P.B.*

8.1–113 522.1:621.396.8

Bok, Bart J., **The George R. Agassiz radio telescope of Harvard Observatory.** *Nature*, London, 178(4527):232–234, Aug. 4, **1956.** fig., 6 refs. **DWB**—Description of the 60 ft paraboloid antenna, equatorial mounting and electronic equipment. Some results of investigations on 21 cm wave length on atomic hydrogen in the galaxies are described and further possibilities mentioned. *Subject Headings:* **1. Radio telescopes. I. Harvard Univ. Harvard College Observatory.**—*C.E.P.B.*

METEOROLOGICAL OBSERVATIONS AND INSTRUMENTS

METHODS OF OBSERVATION

See also: **Rainfall intensity-frequency regime** (Hershfield, others), 8.1–289; **Moisture index** (Konček), 8.1–304; **Kansas soil moisture tests** (U. S. W. B.), 8.1–306; **Sferics measurement** (Weil, others), 8.1–392.

8.1–114 551.501:551.594.5

*Norske Institutt for Kosmisk Fysikk, **The Auroral Observatory at Tromsö ($\varphi = 69°39'.8$N, $\lambda = 18°56'.9$E Gr.). Observations 1952.** Its *Publikasjoner*, No. 35, pub. **1954.** 31 p. graphs, 4 figs., numerous tables. **DWB**—A brief description of the auroral and twilight sodium research (spectrograph observation) at Tromsö and Oslo, and ozone observations at Tromsö (9 months) and Longyear, Spitsbergen (7 months) with a Dobson spectrophotometer. The Longyear observations were started in Sept. 1950 by S. H. H. Larsen. The results of the first 2 years of observation there will be published in a separate paper. Following the 1-page discussion are tables of O_3 values for each day of the observation period in 1952. Geomagnetic observations at Tromsö and Bear Island, radio echo observations and hourly ionospheric values of critical E, FoE, and F1, F2 and vertical height, storminess horizontal and vertical intensity and storminess values for each hour of the year are tabulated and shown in graphs. *Subject Headings:* **1. Auroral observations 2. Ozone data 3. Twilight Na 4. Geomagnetic data 5. Ionospheric data 6. Tromsö, Norway 7. Longyear, Spitsbergen. I. Tromsö, Norway. Nordlys-observatoriet.**—*M.R.*

8.1–115 551.501.4:551.55:551.524

Brandejs, Stanislav, **Výpočet zonální složky geostrofického větru z vertikálních řezů polem T^z a Θ^z.** [Calculating the zonal component of geostrophic wind from vertical sections with the field T^z and Θ^z.] *Meteorologické Zprávy*, Prague, 5(2):40–41, **1952.** ref., 8 eqs. French summary p. 40. **DLC**—In connection with calculating zonal and meridional components of the geostrophic wind from vertical sections with the field T^z (virtual temperature) and Θ^z (virtual potential temperature), the author transforms Bleeker's formula so it may be used with these components. *Subject Headings:* **1. Geostrophic wind computation 2. Bleeker's formula.**—*Trans. of author's abstract.*

8.1–116 551.501.42:551.508.57

Leviton, R., **A method of correcting tabulated rawinsonde with speeds for curvature of the earth.** *U. S. Air Force. Cambridge Research Center, Air Force Surveys in Geophysics*, No. 53, June **1954.** 12 p. fig., 3 tables, 3 refs. **DLC**—A method of correcting wind speeds as obtained by rawinsonde observations for the effect of the earth's curvature is presented. The method employs the use of a table and is applicable to tabulated data (wind speed and height) as measured by standard procedures. The only requirements are that the average wind, from the surface to a height, be computed and the rate of ascension be known. The manner of using the table is discussed and examples shown. The basic assumptions upon which the table is constructed are defined. *Subject Headings:* **1. Correction tables 2. Rawin errors.**—*Author's abstract.*

8.1–117 551.506.45:551.506.41

Soares, R. Las constantes hermenéticas antes la nueva convención internacional. [Barométric correction according to the new international agreement.] Rio de Janeiro Nº 9 p. 65–73 Jan.–Feb. 1955 sp. 7 refs. 21 eqs. D1.0—Chapter is outlined and more refined rules are given for the determination thermal and gravity corrections. The standard gravitational constant is taken as $g = 980.665$ cm sec^{-2} with the corresponding factor $f = 1.000$ 000 and assuming the density of mercury is 13.546. [Author's abstract.] Barometer corrections.—A. G.

8.1–118 513.1.551.501.45

Dietzius, C. und Wallner, E. A. W. Ein neues Gerät zur Messung der Dicke dünner Schichten. [Device to measure thickness of thin layers.] Meteorol. Bulletin Berlin Nº 8 p. 241–243 Sept. 1955 7 figs. 2 refs. In German. Author and French summaries p. 244. D1.0—The principle of instrumental measurement and methods of analysis of observations of gradients and other data is described and an effort is made to apply the phenomena studied. To quote in this paper the air is considered under that it has in the layers of constant temperature. Basic Lapsers and Fourier, the author examines the effect of some environmental and instrumental influences with the result. The discussion shows that the formulae derived by Lapsers may be of importance in the practical work. [Author's abstract.] 1. Convection theory 2. Statistical methods 3. Synoptic functions.—Author's abstract.

8.1–119 551.501.45:551.577

Trnkóczy, Lajos. Prispevek k médre metodiky mjenja prhnenjskih dnevov s tlakom v merskih posodah. [The contribution of methodology of measuring of rain days with pressure in measuring vessels.] Hidrometeorološki Zavod, Prague, 8 [1] p. 1–6 [1] 1955 4 figs. 1 table 20 refs. 8 eqs. Slovene and German summaries p. 1–2. D1.0—German methods of measuring average precipitation in a given area are reviewed. The methods of isohyets, of squares and of polygons are mainly suitable for the mapped topography of Slovenia. [Author's abstract.] That there is a method presented in this [illegible] which makes use of a correction coefficient derived from a comparison of values obtained by the methods of isohyets and of polygons. The use of the method is shown on data for the Vrh River valley. It is recommended that average precipitation be determined for smaller catchments than would require a mesh network page between them. The [illegible] was. [Author.] Rainfall 1. Precipitation calculations 2. Isohyetal charts 3. Vrh River valley, Czechoslovakia.—A. G.

8.1–120 551.501.45:551.556.4(04.3)

Gringorten, I. Equiprobable test-wind statistics for variable trades. [Cruz Bruno Mercantile Aeronáutica Company, Rio de Janeiro] Nº 9 p. 1–11 June 15, 1955 2 figs. 2 tables 5 refs. 10 eqs. Abstr. D1.0—For practical reasons extreme wind data for the most favourable of several tracks from the point of view of turbulence instead of the actual shortest track. A numerical method is given for rapid computation of the frequency distribution of wind-component headwinds along L or a alternative tracks to determine favourable and to assessing the relative merits of the different tracks. The frequency distribution is computed for 4 routes from London to New York. Errors of wind prediction are not considered. [Author's abstract.] 1. Equiprobable headwinds 2. Methods of computation.—A. G. J. S.

8.1–121 551.501.81:551.577

Harper, W. G. Variation with height of rainfall below the melting level. [Cruz Bruno Mercantile Aeronáutica Company, Rio de Janeiro] Nº 9 p. 12–21 June 15, 1955 3 figs. 3 tables 10 refs. 4 eqs. Abstr. D1.0—Some value either of fixed rain gauges 500–6000 ft. below melting level is widespread many local rain were observed in rainfall. Their and normative factors are set out. The procedure was carried out by the A.M. of the gauges in the rest page the record is discussed and a factor 1.1 is applied. The trend results between the decrease of rainfall with height was found. The regression [illegible] below melting was the most was that 1.1 gm ml. [Author.] Rainfall 1. Rainfall precipitation studies.—A. G. J. S.

8.1–122 551.501.83:551.594.2

Reiter, Reinhold. **Annual variations of the atmospherics-existence and explanation of a second maximum in winter, if only strong impulses are counted.** *Journal of Geophysical Research*, Wash., D. C., 61 [1]:25–26, March 1956. 2 figs., 2 refs. DLC.—During a period of five years, impulses of atmospherics have been recorded in the following frequency ranges: Range I, about 10 to 30 kc; Range II, about 4 to 12 kc. Only such impulses are counted and recorded the amplitudes of which exceed the relatively high threshold value of the amplifier. Considering the monthly means of the impulse sum per hour, we note that each of these five years shows two maxima. The first maximum, appearing during the summer months, May to Aug., can be explained easily by the frequency of thunderstorms occurring in central Europe in summer. The second one, however, which appears in winter, is strange. An exact analysis of the large-scale weather processes results in the following: In the fall, the thunderstorm frequency in central Europe and in the Mediterranean regions is lowered because of large anticyclones ('Azores high'). During the winter months, violent invasions of polar air masses into the Mediterranean basin take place. Thus, moist labile gradients are formed over the relatively warm sea water, which give rise to renewed thunderstorms. These large-scale changes of air masses are the reason for the observed winter maximum. *Subject Headings:* 1. **Annual sferics variations** 2. **Sferics from thunderstorms** 3. **Sferics from air masses.**—*Author's abstract.*

OBSERVATIONAL DATA

See also: **Plant phenology** (Schnelle), 8.1–7; **Micromet. investigations** (Peerlkamp), 8.1–15; **Sci. survey, Gough Island** (Holdgate et al.), 8.1–32; **Weather and circulation, May 1955** (Woffinden), 8.1–197.

8.1–123 551.506(26)

Hay, R. F. M., **A comparison between observations from Ocean Weather Station J and contemporaneous British selected ships for the locality.** *Marine Observer*, 20 [173]:154–159, July 1950. fig., 4 tables, 4 refs. DLC.—*Means of nearly 4000 observations from selected ships in 8 2° squares 50–54°N, 10–24°W are compared with means at J 52°N, 20°W. Mean differences between selected ship and J are: pressure 0.0 mb, air temperature −0.4°F, sea temperature −0.3°F, wind +0.3 kn, cloud amount −0.1 okta. The causes of these differences are discussed. The correlation between monthly means ranged from 0.96 (pressure and sea temperature) to 0.56 (cloud). *Subject Heading:* 1. **Ships' observational accuracy.**—*C.E.P.B.*

8.1–124 551.506.2o (049)

Recording the world's weather. *Marine Observer*, 20 [173]:159–161, July 1950. 'Reprint from *The London Times*, March 9, 1950.' DLC.—*Notes about ships' observations in the Antarctic, the role of ships in world synoptic meteorology, and the value of information in ships' logs in answering inquiries, etc. Subject Headings:* 1. **Marine meteorological observations** 2. **Newspaper articles.**—*C.E.P.B.*

8.1–125 551.506:551.542

Schumann, T. E. W., **Voorwoord.** [Preface.] *South Africa. Weather Bureau, Notos*, 3 [1]:5, 1954. DWB.—*Continuous effort to achieve the publication of daily pressure data at selected grid points for the Northern Hemisphere, similar to the data given in* **Notos** *for the Southern Hemisphere, has not been successful as yet. The author considers this as one of the basic conditions for a global weather coverage and for further progress in meteorology. A world conference of recognized meteorological research workers is suggested in order to formulate an international co-operative plan of meteorological research for the next 20 or 30 years. Subject Headings:* 1. **Global weather data** 2. **Pressure data** 3. **World climate coverage** 4. **Northern Hemisphere** 5. **Southern Hemisphere.**—*I. A.*

8.1–126 551.506.1(458.1)(058)

*Malta. [Meteorological Service.] **Meteorological observations, 1939.** Earlier issues excerpted from Annual Report of the Colonial Government. tables. Observations first

published 1852; interrupted 1855–1857; 1862–1864. On cover: Royal Univ. of Malta. **DWB, GB-MO, MH-BH**—Data for Valletta (14°30′N, 35°53′E, 185′) include pressure, temperature, vapor pressure, relative humidity, cloud, sunshine, rainfall, weather and wind for each month and for the year. *Subject Headings:* **1. Monthly climatic data 2. Annual meteorological reports 3. Malta.**—*M.R.*

8.1–127 551.506.1:551.577(481)(058)

*Norway. Meteorologiske Institutt, **Nedbøriakttagelser i Norge, Årgang 57, 58, 59, 1951, 1952, 1953.** [Precipitation observations in Norway, V. 57, 58 and 59, 1951, 1952 and 1953.] Oslo, Aschehoug, **1954.** 3 pieces. mostly tables; charts. **DLC, DWB**—Daily precipitation data for about 200 stations, monthly and annual precipitation data for about 600 stations, snow depths for 48 stations, percent of normal (1901–30) precipitation for 60 stations, and 5-day sums for all 600 stations, plus a large detailed isohyetal chart of Norway, are presented in the 1951 yearbook. The 1952 and 1953 editions contain the same data, with a few more stations added. Complete annotations about publications, methods of compilation, location of stations, stations dropped and new stations, etc. are given in each yearbook. (For V. 53, **1947,** *see* 2.11–23, Nov. 1951, *MAB.*) *Subject Headings:* **1. Annual meteorological data summaries 2. Isohyetal charts 3. Precipitation data 4. Snow depth data 5. Norway.**—*M.R.*

8.1–128 551.506.1(058)(481)

*Norway. Meteorologiske Institutt, **Norsk Meteorologisk Årbok, 1953, 1954.** [Norwegian meteorological yearbook, 1953, 1954.] Oslo, Grøndahl, **1954, 1955.** two pieces. 137 p.+139 p. mostly tables. foot-refs. In English and Norwegian. Price: Kr. 10.00. **DWB, DLC**—This excellent series of yearbooks contains station location charts for 210 stations, explanations of tables, symbols; annotation of instruments, observational methods, etc.; bi-hourly pressure, temperature, relative humidity, wind and precipitation values from automatic records at Oslo (Blindern); anomalies of pressure and temperature from 1901–30; mean values, monthly mean sea surface temperatures for 12 representative coastal stations; thrice daily observations at Oslo, Bergen, Trondheim and Tromsö; monthly and annual summaries of regular meteorological elements for 160 stations; 5-day mean air temperature for 37 stations and daily or thrice daily observations at Arctic stations (Isfjord, Spitsbergen, Hopen Island, Bear Island, Jan Mayen and Myggbukta, Greenland) for 1952 and 1953. (For 1949 issue, *see* 2.11–22, Nov. 1951, *MAB.*) *Subject Headings:* **1. Meteorological yearbooks 2. Annual meteorological data summaries 3. Observational data 4. Norway 5. Arctic islands 6. Myggbukta, Greenland.**—*M.R.*

8.1–129 551.5.06.1(481)(058)

*Norway. Meteorologiske Institutt, **Oversikt over luftens temperatur og nedbøren i Norge i året 1953.** [Summary of air temperature and precipitation in Norway in 1953.] Oslo, Grøndahl, **1954.** 20 p. mostly tables. Price: Kr. 0.53. This is Supplement P, to the Annual Report of the Norwegian Director of Agriculture. *Norway. Landbruksdirektoratet Årsmelding, Tillegg P.* **DWB** –Contains summary of weather for each month of 1953 and for the year. Tables give monthly and annual mean temperature and departure from normal; total precipitation and percent of normal (1901–30), and highest and lowest temperature of the year and date thereof for 70 stations in Norway. *Subject Headings:* **1. Annual meteorological data summaries 2. Climatic data 3. Norway.**—*M.R.*

8.1–130 551.506.1(689.7)(058)

*Nyasaland. [Meteorological Service], **Meteorological observations.** Excerpted from Annual Report of the Colonial Government. Publication of the Blue Book suspended after 1938. "From 1948– data for Nyasaland to be published by Rhodesia and Nyasaland Meteorological Service. The data will no longer be included with Colonial Government Annual Report reprints." Running title: **Summary of Meteorological Observations. DWB, MH-BH, GB-MO**—The 1947 issue gives standard tables of monthly and annual mean temperatures,

unshine, rainfall and the 8:30 a.m. dry and wet bulb, dewpoint and cloud amount are given or 13 stations in Nyasaland. In some cases the barometric pressure at 8:30 a.m. is also given. Stations range in elevation from 150 to 4500 ft. *Subject Headings:* **1. Annual meteorological ata summaries 2. Observational data 3. Nyasaland.**—*M.R.*

8.1–131 551.506.1(664)(058)

Sierra Leone. Meteorological Service, **Annual summary of observations,** 1909(?)–Latest issue seen, 1953, pub. 1956 by British West African Meteorological Services. Originally xcerpted from the **Annual Report** of the Colonial Government, and later from **Annual Report** f the Meteorological Services of Sierra Leone. Title varies: **Meteorological Observations** n earlier issues. **1953** issue, 30 p. almost entirely tables. **DWB, DLC, MH-BH**—In the atest volume, extensive notes accompany the tables of data for 46 stations, containing monthly nd annual mean temperature, relative humidity, vapor pressure, cloudiness, wind and rainfall or 21 stations. Pressure is given for 7 stations, and rainfall for 46 stations, while sunshine is ecorded for 8 stations. Daily 9 h, 15 h and 21 h data are given for Freetown (Lungi). *Subject Headings:* **1. Annual meteorological data summaries 2. Climatic data for Sierra Leone . Sierra Leone.**—*M.R.*

INSTRUMENT CARRIERS

See also: **Precip. at sea** (Skaar), 8.1–20.

8.1–132 551.507.2

Nechaev, I. N. and Svarchevskiĭ, V. N., **Metallicheskie konstruktsii dlia ustanovki riborov na meteorologicheskikh stantsiiakh.** [Metal supports for instruments at meteorological stations.] *Leningrad. Glavnaia Geofizicheskaia Observatoriia, Trudy,* No. 34(96): 7–84, **1952.** 4 figs., 4 tables. **DLC**—The superiority of metallic over wooden supports for nstruments is discussed and various experimental metal structures developed by the construction section of the Principal Geophysical Observatory are diagrammed and described. They include a metal fence to enclose the weather station compound, anemometer masts, ases for the psychrometer, self-recording instruments and rain gage, collapsible stairs for nstrument shelters, bases for the rain gage and for actinometric instruments. The results f tests on the use of these metallic structures under different climatic conditions are discussed. *Subject Headings:* **1. Meteorological instrument supports 2. Instrument shelters.**—*I.L.D.*

8.1–133 551.507.36:629.19

Hagen, John P. (*Naval Res. Lab., Wash., D. C.*), **The exploration of outer space with an arth satellite.** *Institute of Radio Engineers, N. Y., Proceedings,* 44(6):744–747, June **1956.** figs. **DLC**—Sometime during the coming Geophysical Year (July, 1957 to Dec., 1958) an ttempt will be made to launch an artificial satellite in an orbit around the earth. The Office f Naval Research has been assigned the responsibility to perform this task and has established roject Vanguard in the Naval Research Laboratory to carry it out. The Dept. of Defense urned to the Navy to manage this triservice project because of its extensive experience in pper-atmosphere research with rockets. The satellite which Project Vanguard intends to aunch in an orbit is a small one, yet must be a research vehicle. The National Committee or the IGY of the National Academy of Sciences has established a panel which is concerned ith the nature of the scientific experiments to be done in the vehicle. Work is in progress ot only on the vehicles, but on the experiments to be done in the satellite. Experiments onducted in an artificial earth satellite circling the earth in the outer tenuous region of our tmosphere can greatly increase our knowledge of the atmosphere—its structure, its constiuents, and the powerful radiations both electromagnetic and corpuscular that impinge upon and help determine its state. *Subject Headings:* **1. Satellite observatories 2. Project anguard 3. Outer atmosphere investigation.**—*Author's abstract.*

8.1–134 551.507.36

Foster, J. A.; Sicinski, H. S. and Schulte, H. F., **Modification of Air Force type J-8 attitud horizon indicator for aerobee aspect instrumentation.** Michigan. Univ. Engineering Re search Institute, Contract AF 19(604)-545, Technical Note, No. CT-2, July **1955.** 68 p figs.—This report presents the procedures necessary for the modification of a standard Ai Force type J-8 attitude horizon indicator for Aerobee aspect instrumentation. The gyro a manufactured is a "vertical gyro" which, as such, is not satisfactory for missile use. Th modification procedure converts the instrument to a "free gyro" which is suitable for Aerobe missile use. Detailed drawings, photographs, and a description of special equipment and tes procedures are included so that a well-trained technician or an engineer can achieve the desire result. *Subject Headings:* **1. Altitude horizon indicator 2. Aerobee rocket instrumentation.**— *Authors' abstract.*

8.1–135 551.507.36

†Franklin Institute. Laboratories for Research and Development, Phila., **Development design, instrumentation. Blossom 4 series.** Contract AF 19(122)-33, Final Report F-2106 March 1, **1950.** 2 v. (401 p.) numerous figs. (some fold., also many photos, some in color) refs. Vol. 2, p. 306–308; bibliog. Vol. 2, p. 401. **DWB**—The details of history, organizatio design, development, instrumentation and launching of the V-2 rockets at White Sand (Blossom I, II-A, II-B, and III and Aspect I, II, and III from Feb. 29, 1947 to June 11, 194 in Missiles No. 20, 28, 37 and 39) are treated in Vol. 1, along with complete information abou the development of the V-2 and other rockets in Germany from 1932–1942. The secon volume deals with the design, development and instrumentation of the Blossom IV series Blossom IV-A was carried by V-2 rocket No. 41 fired on March 21, 1949. Radiation, electrica pressure, temperature, ionospheric and other data were obtained by parachute, radar, radio an optical methods. Blossom IV-B was fired June 14, 1949. *Subject Headings:* **1. Rocke research 2. Rocket instrumentation 3. V-2 rocket flights 4. White Sands, N. Me I. Allen, Henry B.**—*M.R.*

8.1–136 551.507.362:621.39

Haas, Herbert W., **Telemetering notch antenna 225.0 MC/Sec Aerobee Hi rocket.** Ne Mexico. College of Agriculture and Mechanic Arts. Physical Science Laboratory, Contrac AF 19(604)-409, Scientific Report, No. 2, Feb. 6, **1956.** 35 p. 27 figs. (incl. photos).—Th design and development of a 225.0 Mc/Sec notch antenna for the Aerobee Hi rocket is presente A detailed radiation pattern study has been made of the antenna installed in a full scale siz rocket mockup. The radiation patterns have been measured for linear, right circular and le circular polarization. Measured power contour plots are presented to show the distributio of power in the aft region of the missile. A number of photographs of the antenna, rocke mockup and antenna range facilities are included in this report. Electrical and mechanica details of the antenna are shown by the drawings. *Subject Headings:* **1. Telemetering system 2. Aerobee Hi rockets.**—*Author's abstract.*

8.1–137 551.507.362:551.50

Schulte, H. F., **Power supplies and a remote-control system suitable for aerobee rock instrumentation.** Michigan. Univ. Engineering Research Institute, Contract AF 19(604) 545, Technical Note, No. CT-3, Dec. **1955.** 14 p. 7 figs., eq.—A general discussion of th operating characteristics and experience with the Airpax 400-cycle, d-c to a-c power inverte is presented. Performance curves for the inverter and circuit diagrams of an electronicall regulated power supply and a flexible remote-control system suitable for rocket-borne us are included. The important problem of power-supply reliability has also received attentio A simple, yet effective, method of enhancing reliability by automatically switching to auxiliar or standby power is diagrammed. *Subject Headings:* **1. Rocket instrumentation 2. Aerobe rockets.**—*Author's abstract.*

INSTRUMENTS

See also: **Low ceiling/visibility equipment** (Sperry Gyroscope Co.), 8.1–90; **Rawinsonde data correction** (Leviton), 8.1–116; **Barometric corrections** (Sneyers), 8.1–117; **Aerobee rocket instrumentation** (Schulte), 8.1–137; **Negative heavy meson obs.** (Michaelis, Powell), 8.1–226; **Depth of frozen soil** (Nogami), 8.1–240; **Atmos. waves study** (Corby), 8.1–241; **Evaporation** (Kacvinský), 8.1–263; **Water vapor condensation in sand and gravel** (Bac, Marcilonek), 8.1–302; **Visibility in air pollution studies** (Clayton, Giever), 8.1–363; **Potential gradient measurement** (Koenigsfeld), 8.1–377; **Charge distribution and electrical processes** (Malan, Schonland), 8.1–385.

8.1–138 551.508.71

Kir'iashkina, Z. I. and Nosova, V. A., **Elektroliticheskie gigrometry.** [Electrolytic ygrometers.] (In: U.S.R. Akademiia Nauk SSSR, Institut Geografii [and its] Institut esa, **Mikroklimaticheskie i klimaticheskie issledovaniia v Prikaspiĭskoĭ Nizmennosti,** Ioscow, **1953.** p. 163–167. 4 figs., table, 3 refs.) **DLC**—Because of the inconvenience and ilkiness of various types of hair hygrometers and psychrometers used to determine humidity the air, a new type of electrolytic hygrometer was devised and constructed which meets e requirements of constancy of calibration curves with time and can be used under various orking conditions. This paper gives a description of the newly developed electric hygrometers nd gives the results of field experimentation of models carried out in 1951. *Subject Heading:* **Electric hygrometers.**—*A.M.P.*

8.1–139 551.508:631.43:536.24

Buettner, K. (*Dep. of Met. and Climatology, Univ. of Wash.*), **Evaluation of soil heat onductivity with cyclindrical test bodies.** *American Geophysical Union, Transactions,* 5(5):831–837, Oct. **1955.** 3 figs., 19 refs., numerous eqs. **DWB, DLC**—Different solutions the temperature increase with time of a heated cylinder are discussed. This increase epends on cylinder geometry, heat conductivity of the medium, and on the ratio of specific eats of cylinder and medium. For compact cylinders and not too fluffy media, the tem- erature increase is independent of the heat capacity of the medium. This heat capacity, the thermal diffusivity, cannot be evaluated using compact cylinders, whereas hollow cyl- nders or plates yield data of the product conductivity × density × specific heat. The heat ansfer coefficient of liquids or gases flowing across cylinders shows a certain observed positive alue when forced or free flow vanish. These transfer coefficients are explained as being aused by heat flow from the heated cylinder into a quasi-infinite nonmoving medium. *Subject eading:* **1. Soil heat conductivity measurement.**—*Author's abstract*

8.1–140 551.508:631.43:536.24

Buettner, K. (*Dep. of Meteorology and Climatology, Univ. of Wash.*), **Small portable meter r soil heat conductivity and its use in the O'Neill test.** *American Geophysical Union, ransactions,* 36(5):827–830, Oct. **1955.** 2 figs. **DWB, DLC**—A hypodermic needle is fitted, its bore, with an electrical heating wire and a thermocouple. With certain precautions, its mperature increase yields data of soil heat conductivity. Very large local variations of the eat conductivity λ were found in the upper centimeters of the surface by this instrument at ne U.S.A.F. Great Plains Turbulence Project at O'Neill, Nebraska, in 1953. *Subject Heading:* **Soil heat conductivity meters.**—*Author's abstract.*

8.1–141 551.508.29:536.532

Höhne, W.; Möde, A. and Schmidt, M., **Kompensation des Einflusses der Vergleichs- mperatur bei thermoelektrischen Messungen.** [Compensation for the influence of the omparison temperature in thermoelectric measurements.] *Zeitschrift für Meteorologie,* 0(5):131–136, May **1956.** 3 figs., 7 refs., 18 eqs. **DLC**—A compensation arrangement to iminate the effect of the comparison temperature is described. It consists of a tem- erature-sensitive bridge switch and a thermostat. The comparison temperature must be ept constant (e.g., by a water-ice mixture) during thermoelectric measurements. Little emand is made on the constancy of the bridge tension and the temperature of the interior of ne thermostat which in measurements in the open can be measured by simple means, e.g.,

for an accuracy of ±0.1° a temperature uniformity up to 2° and a tension constancy of 4% suffice. *Subject Heading:* **1. Thermoelectric measurement.**—*Trans. of authors' abstract.*

8.1–142 551.508.57 551.508.822

Electronics applied to meteorological instrumentation. *Meteorological Magazine*, London, 84(994):115-120, April **1955. DWB**—Meteorological Office discussion on Jan. 17, 1955, was opened by R. ALMOND with an account of modern radio and radar air-borne instruments. Britain, America and Holland use a variable audio-frequency type, Finland the variable radio-frequency type, Canada, Switzerland, India, etc., the chronometric type. The various British and American radar systems were described. The discussion dealt mainly with the secondary communication techniques. *Subject Headings:* **1. Radiosondes 2. Radar wind instruments.**—*C.E.P.B.*

8.1–143 551.508.57

Leviton, R., **Height errors in a rawin system.** *U. S. Air Force. Cambridge Research Center, Air Force Surveys in Geophysics*, No. 60, Dec. **1954.** 17 p. 8 tables, 8 refs. **DLC**—The two types of height errors which exist in a rawin system, namely the error in the height of a pressure surface and the radiosonde position error, are analyzed. The various instrumental errors responsible for these height errors are examined. The magnitude of the height errors as obtained from the present-day rawinsonde is compared to that which would result from use of the remitter-type radiosonde and hypsometer currently being developed. The comparisons show that these new developments would not appreciably affect the pressure-height error, but would greatly reduce the position error, with a corresponding increase in wind data accuracy. Tables and examples illustrating the height errors are given. *Subject Headings:* **1. Rawin errors 2. Pressure-height error in rawins.**—*Author's abstract.*

8.1–144 551.508.71:536.

Bouman, D. J. (*Royal Neth. Met. Inst.*), **A theory of the ventilated psychrometer based on the thermodynamics of irreversible processes.** *Tellus*, 6(4):399-404, Nov. **1954.** 6 refs. 40 eqs. **DLC**—The traditional theory of the ventilated psychrometer is criticized as being a variance with the fundamental postulates of thermodynamics since the wet bulb thermometer does not fulfill the requirements of a closed system, equilibrium conditions, of quasi-static and reversible processes. The author thus applies the thermodynamics of irreversible processes developed by PRIGOGINE and DEGROOT to the derivation of the psychrometric equation without using pseudothermostatic reasoning. *Subject Headings:* **1. Ventilated psychrometer 2. Thermodynamics of psychrometers.**—*I.L.D.*

8.1–145 551.508.71:551.575.

Fukutomi, Takaharu and Sugawa, Akira, **A measurement of humidity in the foggy air.** *Low Temperature Science, Ser. A, Physical Sciences*, Sapporo, Japan, No. 11:19-27, 1953. 3 tables. 7 refs., 25 eqs. In Japanese; English summary p. 27. **DWB**—It is known that with regard to advection fog in the daytime the relative humidity was frequently less than 100%. This fact is significant to the study of fog dissipation, therefore a simple instrument was set up to measure humidity of foggy air more accurately. The instrument consisted of a hollow cylinder (11 cm diameter) and a set of wire-screens of fine mesh stretched parallel to each other at one end of the cylinder (to capture fog water); a fan, rotated with an electric motor, is put at the other end and acts as the exhaust pump. A thick cloth (with which the internal wall of the cylinder is lined) serves as the heat insulator; wet and dry bulb thermometers record temperatures within the cylinder. Several minutes after the instrument is set in action, it attains the stationary state. In this case, the following relations hold approximately: $h \cong \frac{Q'}{Q}\left(h' - 100\frac{\varphi}{Q'}\right)$; $T \cong T' + \frac{l}{\rho_a C_a}\varphi$; where T—air temperature. h—air humidity; T'—temperature of air in cylinder; h'—humidity of air in cylinder; Q—saturated water vapor in the air; Q'—saturated water vapor in cylinder; $\rho_a C_a$—density and specific heat of dry air, respectively; l—the latent heat of evaporation of water; φ—fog water content in the air. In 1952, the author carried out some field observations on the humidity of fogg

air at Akkeshi on the Pacific coast of Hokkaido, and obtained the values 95∼100% for the humidity of fogs with $\varphi = 0 \sim 300$ mg/m³ near the ground. *Subject Headings:* **1. Humidity instruments 2. Water content of fog 3. Hokkaido, Japan.**—*From authors' abstract.*

8.1–146 551.508.71

Hamilton, R. A., **The measurement of humidity at Britannia Sϕ 1952–53.** *Great Britain. Meteorological Research Committee, M.R.P.*, 983, May 14, **1956.** 10 p. 2 figs., 6 tables. Mimeo. **DWB**—The hygrometers used by the British North Greenland Expedition at Britannia Sϕ (77°9′N, 23°36′W) for measuring humidities at low temperatures were dry and wet bulb, hair hygrometer and lithium chloride hygrometer (LCH). Comparisons between these are set out in a number of tables and standard errors given. Calibration of LCH is plotted. *Subject Headings:* **1. Low temperature hygrometry 2. Greenland.**—*C.E.P.B.*

8.1–147 551.508.71:551.579.5

†Hofmann, Gustav, **Ein Gerät zur Registrierung der Bodenluftfeuchtigkeit.** [Apparatus for recording soil air humidity.] **1950.** Thesis (Ph.D.)—Ludwig-Maximilians-Universität, Munich, Nov. **1950.** 104 p. 36 figs. (incl. photos tipped in), 72 refs. Biographical note, following p. 104. **DLC**—The work was done under the guidance of Prof. Geiger and Dr. Schmauss. The available literature on the subject is thoroughly reviewed. This excellent thesis presents the numerical results of tests made near Munich in 1950 with a cellophane foil humidity element, compared with the hair hygrometer, and elaborate recording apparatus similar to radiosonde records used in U. S. All equipment records and graphical results are illustrated with glossy prints and diagrams of the different elements or instrument layouts. The device is much more accurate at high relative humidities and less accurate at low (<50%) than the hair hygrometer. Complete micrometerological observations were made at different sites and with different types of cover. *Subject Headings:* **1. Soil-air humidity instruments 2. Soil-air humidity measurement 3. Micrometeorological observations 4. Germany.**—*M.R.*

8.1–148 551.508.71:551.55

Kopcewicz, Teodor, **On the influence of wind velocity on the psychrometric constant** *Acta Geophysica Polonica*, Warsaw, 1(2):82–93, **1953.** 3 figs., 2 tables, 6 refs., eqs. **DLC, DWB.** Also his: **Wpływ prędkosci wiatru na stała psychrometryczna.** [Influence of the force of the wind on the psychrometric constant.] *Poland. Pánstwowy Instytut Hydrologiczno-Meteorologiczny, Wiadomósci Sluzby*, 3(4):281–286, **1954.** table, 3 diagrs., 6 refs., numerous eqs. French and Russian summaries p. 286. **DWB**—Apparatus and method of measurement of the psychrometric constant for an Assmann psychrometer consisting of station and Assmann thermometers carried out in a wind tunnel (79 cm in diameter and 76 cm long) at the State Hydrological and Meteorological Institute at various air stream velocities from 0 to 40 m/sec are described and explained. A discussion of the value of 4 different expressions for the psychrometric constant, depending on the admitted process of heat exchange between the wet bulb and the surroundings follows. *Subject Headings:* **1. Psychrometric constant 2. Assmann psychrometer 3. Wind velocity.**—*A.M.P.*

8.1–149 551.508.71

MacDowall, J., **An electrical dewpoint hygrometer suitable for routine meteorological use.** *Great Britain. Meteorological Research Committee, M.R.P.*, 977, April 30, **1956.** 4 p. 15 figs., 2 tables, 3 refs. Mimeo. **DWB**—A hygrometer suitable for continuous recording of dewpoint (resembling that of J. H. Conover) is described and illustrated. It consists of a varnished brass tube covered with glass tape impregnated with lithium chloride and wound with two parallel silver wires. Operation and comparison with Assmann psychrometer are described; accuracy is better than ±3%. *Subject Heading:* **1. Dew point hygrometers.**—*C.E.P.B.*

8.1–150 551.508.71

Mercanton, P.-L., **Dispositif assurant ombrage et ventilation au psychromètre Crecelle.** [Device assuring shade and ventilation for the Crecelle psychrometer.] *La Météorologie*, Paris, Ser. 4, No. 36:466–468, Oct./Dec. **1954.** 3 figs. **DWB**—The device used with success

for 10 yrs at the observatory of Lausanne (Switzerland) is described and shown on 2 photos and a diagram. A solid axle around which rotates a frame, such as the one used for the Crecelle psychrometer, is set up on the small side of the frame opposite the thermometer bulb. It is intended to supply the instrument with a movable device admitting moisture, but protecting the mercury bulbs from external irradiation, and on the other hand forcing the air to circulate along them. The ventilation will be provided by the rotation of the Crecelle at the proper rate of speed. *Subject Heading:* **1. Ventilated psychrometers.**—*A.M.P.*

8.1–151 551.508.71

Misselwitz, W. (*Radiosonde Center, Berlin*), **Experimentelle Bestimmung des Trägheitskoeffizienten von gewalzten Hygrometerhaaren.** [Experimental determination of the coefficient of inertia of rolled hair hygrometers.] *Zeitschrift für Meteorologie*, Berlin, 8(10): 310–313, Oct. **1954.** 5 figs., ref., eqs. **DWB**—The author describes a measuring device for determining experimentally the inertia of hair hygrometers. Rolled hygrometer hairs used in the radiosondes of the German Democratic Republic and West German Frankenberger hairs were measured in this device. The measurements are shown graphically. The differences between these results and those of W. SCHULZE are explained by the "inherent inertia" of the measuring device. *Subject Headings:* **1. Hair hygrometers 2. Inertia coefficient.**—*Trans. of author's abstract.*

8.1–152 551.508.71:551.508.91

Nolan, P. J. and O'Connor, T. C. (*Univ. College, Earlsfort Terrace, Dublin*), **The photoelectric nucleus counter as hygrometer.** *Geofisica Pura e Applicata*, Milan, 31:32–36, May/August **1955.** 2 figs., 4 refs., 2 eqs. English and German summaries p. 32. **DWB, DLC**—Hygrometric measurements of room air were made with a Nolan-Pollak nucleus counter from which the lining of blotting paper had been removed. The dew point can be determined from the critical overpressure for condensation on nuclei. Satisfactory agreement with the values given by a ventilated wet and dry bulb hygrometer was obtained. The correction required is small since condensation occurs on ordinary atmospheric nuclei when the temperature is brought to about 0.3°C below the dew point. *Subject Headings:* **1. Photoelectric nuclei counters 2. Hygrometry.**—*Authors' abstract.*

8.1–153 551.508.71:551.508.822:551.571.7

Raab, Lars (*Swedish Met. and Hydrol. Inst., Stockholm*), **The Finnish radiosonde with rolled hair as hygrometer.** *Tellus*, 6(4):405–407, Nov. **1954.** 2 figs., 2 refs. **DLC**—As shown on two charts, the rolled hair hygrometer element used in a Finnish radiosonde gave much more sensitive records of humidity both in the low troposphere inversion (Jan. 27, 1954) and in the stratosphere than did the normal hair hygrometer (as shown on same graph). The rolled hair gave humidities ranging from 100% down to <15%, whereas the normal hair did not go below 60% or above 80%, and indicated nothing at all (no variation) above 600 mb level. Rolled hair is good to −70°C, though correction factors are not as accurate in stratosphere as in lower levels. It is not yet adaptable to audiofrequency radiosondes. *Subject Headings:* **1. Hair hygrometers 2. Radiosonde hygrometers.**—*M.R.*

8.1–154 551.508.71

†Roman, W. and Akehurst, C. (both, *Petrochemicals, Ltd. Manchester, Eng.*), **Determination of moisture in gases.** *Lisbon. Universidade. Faculdade de Ciências, Report, Ser.* 2, *B. Ciências Físico-Químicas*, 3:5–22, **1954.** 5 figs., 2 tables, 49 refs. **DWB, DLC**—Methods of measuring moisture in gases depend on range of moisture content expected and type of gas to be analyzed, whether in the laboratory, in industry or in nature. The present article deals with methods involving adsorption of moisture by a desiccant and weighing, dew point estimation (by psychrometers, hair hygrometers and direct measurement of dew point temperature), chemical methods (reactions with chemicals which absorb moisture or combine with H_2O), electrical conductivity and, finally, optical (infrared spectroscopy) or thermal conductivity methods. *Subject Headings:* **1. Moisture content determination 2. Humidity instruments.**—*M.R.*

8.1–155 551.508.71

Shimoda, S. and Fujiwara, S., **Note on the wet bulb scale reading.** *Journal of Meteorological Research*, Tokyo, 5(10/12):786–789, Jan. 1954. 6 figs. In Japanese; English summary p. 786. **DWB**—The time required for the ventilation psychrometer to reach a steady state was found to be >4 min. when the wet bulb temperature is >0°C; >10 min. at the freezing point (0°C), ~5 min when a small amount of water freezes in the bulb, and ~8 min when a large amount of water freezes in the bulb. *Subject Heading:* **1. Ventilated psychrometers.**—*From authors' abstract.*

8.1–156 551.508.71

Sonntag, D. (*Geophys. Inst., Leipzig*), **Erfahrungen bei der Prüfung der Ventilationsgeschwindigkeit des Aspirationpsychrometers.** [Results obtained in testing the ventilation rate of aspiration psychrometers.] *Zeitschrift für Meteorologie*, Berlin, 8(11/12):373–376, Nov./Dec. 1954. 2 photos, 5 tables, 2 refs. **DWB**—The aspiration testing device of R. Assmann and of B. von Sigfeld is described and the recently developed properties of this apparatus are described and illustrated. Formulas and tables for obtaining ventilation speeds are presented. The effect of the mantle at the thermometer vessel is investigated for a spherical thermometer vessel with a diameter of 10 mm and for a cyclindrical vessel with a diameter of 4 mm. *Subject Heading:* **1. Aspiration psychrometers.**—*I.L.D.*

8.1–157 551.508.71:551.571.4

Thornthwaite, C. W. and Beenhouwer, Owen, **The measurement of humidity profiles.** *Johns Hopkins Univ. Laboratory of Climatology, Publications in Climatology*, 7(2):261–270, 1954. fig. **DWB**—Description of the development of a dew point meter. Appearance of fog on mirror is measured photoelectrically, the mirror temperature by a thermocouple. Calibration is necessary, since results depend on thickness of the dew film. Calibration depends also on temperature of sampled air. Numerous difficulties had to be overcome until accuracy up to 0.03° could be reached. In addition to the automatic dew point apparatus, a portable model has been developed. *Subject Headings:* **1. Humidity measurement 2. Dew point recorders.**—*A.A.*

8.1–158 551.508.9:551.521.16

Blackwell, M. J. and Powell, D. B. B., **On the development of an improved daylight illumination recorder.** *Great Britain. Meteorological Research Committee, M.R.P.*, 988, June 1, 1956. 10 p. 8 figs., table, 9 refs. Mimeo. **DWB**—The faults of the present Mk II instrument at Kew include a temperature coefficient, cosine law response, spectral sensitivity and unequal illumination of diffusing plate. An improved model Mk III is described in which these are corrected. Comparisons between Mk II and III are given. *Subject Heading:* **1. Illumination meters.**—*C.E.P.B.*

SYNOPTIC ANALYSIS AND FORECASTING

See also: **Medical-met. forecast** (Kuhnke), 8.1–4; **Forecasting** (Takahashi), 8.1–11; **Forecasting** (Hofman), 8.1–12; **Ice code** (Barlow), 8.1–56; **Ships' observation** (Portig), 8.1–77; **Forecasts at sea** (Prager), 8.1–78; **Aeronautical met. codes** (U. S. W. B.), 8.1–92; **Agricultural met.** (Brochet), 8.1–94; **Absolute vorticity trajectories** (Frank), 8.1–182; **Subtropical jet stream** (Ramaswamy), 8.1–202; **Frost formation** (Serra), 8.1–234; **Wind, Tsugaru Strait** (Kon), 8.1–246; **Weather and indicators of vertical motion** (Sanders), 8.1–258; **Dew point temp. and weather forecasting** (Kinoshita), 8.1–259; **Raincloud structure** (Ludlam), 8.1–269; **Great-volume rainstorm** (Lott), 8.1–290; **Snow survey, Japan,** 8.1–299; **Water-level forecasting** (Fukunaga), 8.1–300; special bibliography on **Solar relations with weather,** p. 000.

8.1–159 551.509.31

Mollwo, Hans, **Durchführung des synoptischen Dienstes beim Wetteramt Frankfurt.** [Operation of the synoptic service at the Weather Bureau, Frankfurt.] *Germany. Deutscher Wetterdienst, Mitteilungen*, No. 10:6–10, Feb. 1955. **DWB**—The question of deciding which of the numerous observation records and data arriving daily at the Frankfurt Weather Bureau

are indispensable for the preparation of short and medium range weather forecasts, which of the records can be dispensed with, and to what extent the Bureau's analyses of the weather situation may be replaced by available results of the "Analysis Center" is discussed on the basis of experiments made in the summer of 1954 at the Bureau. An experiment of plotting a sector map of West and Central Germany 1–10 mill. (instead of the usual 00 hour surface-and-low pressure maps of the Europe/Atlantic area in 1–10 mill. scale) and using analyses of the Analysis Center as a supplement without applying any individual reports, which resulted in time saving, proved to be inadequate not only for answering the requirements of agencies, agriculture and industries, but still in a greater degree for the preparation of forecasts. A timetable of the daily work and a schedule of issuances of the various information and forecasts of the Bureau is included. *Subject Headings:* **1. Short range forecasting 2. Extended forecasting 3. Synoptic analysis 4. Germany.**—*A.M.P.*

8.1–160 551.509.31

Schmidt, Georg, **Wetterkartenanalyse.** [Weather map analysis.] *Germany. Deutscher Wetterdienst, Mitteilungen*, No. 10:31-37, Feb. **1955.** 6 figs. **DWB**—In order to reduce discrepancies in locating fronts on surface weather and upper air charts plotted by different weather stations, the author points out a number of factors which should be considered. They are: convergence, temperature, dew point, pressure tendency, precipitation, cloudiness and water temperature (at sea); temperature above the surface frictional layer (850 mb) and relative topographies on upper air charts. Greatest importance is attributed to convergence; temperatures at the surface and at 850 mb are considered to be good indicators. Finally, the author points out the lack of agreement among authors on the number of air masses; while KHROMOV mentions 14 in Middle Europe, and WILLET (1944) 20 types in North America; SCHERHAG names 20 for Europe. This leads to great confusion. The author cites as example a case when the same air mass was given 5 different names on 5 different maps of the same day. *Subject Headings:* **1. Synoptic analysis 2. Frontal movement 3. Forecast accuracy.** —*A.M.P.*

8.1–161 551.509.312:551.55:518.3

Brandejs, Stanislav, **Diagram pro výpočet advekčních tlakových zmen.** [Nomogram for computing advective pressure changes.] *Meteorologické Zprávy*, Prague, 5(3):75–77, **1952.** 5 figs., 18 eqs. **DLC**—The mechanism of pressure changes at a given level is analyzed mathematically as a function of advection below that level. From the equation developed a nomogram is constructed for use in computing pressure tendency at 3 km (700 mb) from average wind velocity (km/hour) up to 3 km. *Subject Headings:* **1. Advective dynamic analysis 2. Barometric tendency calculation 3. Nomograms.**—*G.T.*

8.1–162 551.509.312:681.14:621.38

§Institute for Advanced Study, Princeton, N. J., **Electronic Computer Project.** Contract DA-36-034-ORD-1023, Final Report, April **1954.** Pt. 1, 60 p. 15 figs., 6 tables. Pt. 2, 137 p. figs., tables, 6 refs., numerous eqs. **DWB**—A voluminous report covering: 1) Engineering work on numerical integration and input and output testing equipment, and on maintenance. 2) Mathematics (total differential equations), flows past curved obstacles, eigenvalues of symmetric matrices, spherical blast wave, random numbers, solid diffusion in fixed beds and other problems stemming from Richardson's work. 3) Meteorological problems of the barotropic 2-level and baroclinic or 3-level models. Tests were made on the Nov. 23 to 26, 1950 storm which affected the Princeton–New York area. The 6, 12, 18 and 24-hour forecast height deviation charts for Nov. 24 and 25, 1950 are given along with the actual Nov. 25, 1950, 900 mb chart, showing that strong winds and developments were fairly accurately predicted by these methods. *Subject Headings:* **1. Numerical forecasting 2. Electronic computers.**—*M.R.*

8.1–163 551.509.312

Jensen, K. Morch and Nielsen, A. Winn (*Danish Met. Inst.*), **Motion of surface pressure centers in relation to upper mean maps.** *Geophysica*, Helsinki, 4(3):100–104, **1953.** eqs. **DWB**—Two current methods of forecasting the 24-hour displacement of surface pressure centers are tested for accuracy in practical forecasting and to measure the error with a view

towards improving the rules. The first method is the 50% rule on 500 mb charts. The second is the Fjørtoft (1952) method of using a 500 mb space-mean-map. Methods are set forth, and results of tests on 75 large cyclones with closed circulation, 25 small cyclones without closed circulation (frontal waves and polar lows) are analyzed. The average displacement in 24 hours of all cyclones was 1130 km and the error 0.25 for the second method, and 1340 km and 0.22 for the 50% rule. Thus centers move faster than 50% of the actual 500 mb motion, and for the Fjørtoft method the centers moved with 75% of the space-mean-field. It was found that cyclones arrived at the forecast point in 27.6±6.0 hours instead of 24 hours, but that even correcting the forecasts by the correct amount, errors were still large due to "derailment." After correcting for derailment (usually the cyclones moved to the left of the streamlines) an error of 0.18 was found in small cyclones and 0.21 for large ones. *Subject Headings:* **1. Cyclone movement forecasting 2. Prognostic surface charts. I. Fjørtoft, R.**—*M.R.*

8.1–164 551.509.312:519.2

Ogawara, M. and Tomatsu, K., **Stochastic numerical prediction for the 500 mb height along the latitude 45°N.** *Journal of Meteorological Research,* Tokyo, 7(4):191–200, June **1955.** 2 figs., 12 refs., eqs. In Japanese; English summary p. 191. **DWB**—The aim of this paper is to synthesize the idea of so-called numerical prediction and that of stochastic prediction into a systematic theory. The discussion is developed by taking as an example CHARNEY-ELIASSEN's numerical prediction scheme which was published in *Tellus,* 2:38–54, **1949** (*see* 2.48, Feb. 1950, *MAB*). A stochastic prediction for a constant pressure height $z(x,t)$ along a latitude circle can be derived from the stochastic prediction for a set of Fourier coefficients of the $z(x,t)$. Our stochastic prediction scheme is constructed so that it includes the CHARNEY-ELIASSEN's method as a part of the scheme and the prediction is expressed by a sort of probability distribution. A numerical example is carried out for the prediction of the 500 mb height profile along the 45°N latitude circle in Jan. 1946. A similar idea may be also applied, at least in its principle, to nonlinear numerical prediction schemes which have been recently developed. *Subject Headings:* **1. Numerical forecasting techniques 2. Probability forecasting 3. Charney-Eliassen method.**—*Authors' abstract.*

8.1–165 551.509.312

Reymann, Georg, **Über qualitative Anwendung theoretischer Ergebnisse im synoptischen Dienst.** [Qualitative applications of theoretical results in the Synoptic Service.] *Germany. Deutscher Wetterdienst, Mitteilungen,* No. 10:101–109, Feb. **1955.** 7 figs. **DWB**—Application of theories of vorticity advection, triple point action ("Dreimasseneck"), and warm air advection in the lower troposphere to forecasting and analysis, especially of the 500 mb layer. *Subject Headings:* **1. Synoptic analysis 2. Synoptic forecasting 3. Advection.**—*M.R.*

8.1–166 551.509.312:551.511

Watanabe, T., **Divergence equation and the inertial oscillation of the air-mass ring** *Journal of Meteorological Research,* Tokyo, 6(6):196–204, July **1954.** 5 figs., 5 refs., numerous eqs. In Japanese; English summary p. 196. **DWB**—We derived the divergence equation

$$\frac{\partial Q}{\partial t} + u\frac{\partial Q}{\partial x} + v\frac{\partial Q}{\partial y} + w\frac{\partial Q}{\partial z} - \lambda\zeta + \beta u + \left(\frac{\partial u}{\partial x}\right)^2 + 2\frac{\partial u \partial v}{\partial y \partial x} + \left(\frac{\partial v}{\partial y}\right)^2 + \frac{\partial w \partial u}{\partial x \partial z} + \frac{\partial w \partial v}{\partial y \partial z} = -\left[\frac{\partial}{\partial x}\left(\frac{l\partial p}{p\partial x}\right) + \frac{\partial}{\partial y}\left(\frac{l\partial p}{p\partial y}\right)\right] + v\frac{\partial^2 Q}{\partial z^2}$$

or, a good approximate equation

$$\frac{\partial Q}{\partial t} = -\left(u\frac{\partial Q}{\partial x} + v\frac{\partial Q}{\partial y} + w\frac{\partial Q}{\partial z}\right) - \beta u - Q^2 + 2\frac{\partial(u,v)}{\partial(x,y)} + \lambda(\zeta - \zeta g) + v\frac{\partial^2 Q}{\partial z^2},$$

where u, v, w is the wind component, Q the horizontal divergence, β the northward gradient of the Coriolis parameter, λ, ζ the vertical component of the relative vorticity and ζg the geostrophic vorticity. And then the physical meaning of each term was examined. And we concluded that the principal part was described by an equation $(dQ/dt)Q^2 = \lambda(Z - Z_g)$, where Z_g is the geostrophic absolute vorticity, and Z the absolute vorticity. Next we solve the

simultaneous equations

$$\begin{cases} \frac{dQ}{dt} + Q^2 = \lambda(Z - Z_0), \\ \frac{dZ}{dt} + ZQ = 0 \end{cases}$$

for stationary circular isobars, and examined the inertial oscillation of an air mass ring and compared the perfect numerical solution. From the results, we concluded that the approximate equation (1) had essential factors. *Subject Headings:* **1. Divergence computations 2. Vorticity equations.**—*Author's abstract.*

8.1–167 551.509.312

Wippermann, F., **Bessere Wettervorhersagen mit elektronischen Rechenautomaten.** [Better weather forecasts with electronic calculators.] *Umschau*, 56(16):491–493, Aug. 15, **1956.** 4 figs. **DLC**—Numerical forecasting was suggested by V. Bjerknes in 1904, but had to wait for more complete synoptic information, knowledge of the laws and ability to solve the equations rapidly. The grid used daily for Stockholm forecasts and the radiosonde stations are shown. The step method of numerical solution (72 steps for a 72 hour forecast) is briefly described. Numerical forecasts which began in Stockholm on Dec. 1, 1954, are significantly better than those by the old method; even 3-day forecasts have a correlation of +.62 with observed pressures. An example of machine forecast isobars is given. The problem of objective conversion of the pressure forecast into a weather forecast is already being tackled. *Subject Heading:* **1. Numerical forecasting.**—*C.E.P.B.*

8.1–168 551.509.312:551.547

§Zimmershied, W., **La topografía relativa con medio auxiliar indispensible para el análisis del mapa meteorológico, especialmente en su aplicación aeronáutica.** [and] **Anotaciones acerca de irrupciones de aire frío de las regiones de Groenlandia y Spitzberg hacia Europa Central y Occidental a finales de otoño o a principios de invierno.** [Relative topography as a necessary auxiliary aid in the analysis of the weather map, especially in its aeronautical application. [and] Notes on the break through of cold air in the regions of Greenland and Spitsbergen toward Central and Western Europe at the end of autumn and beginning of winter.] *Spain. Servicio Meteorológico Nacional, Publicaciones, Serie A, Memorias*, No. 24, **1954.** 40 p. 28 figs. **DWB**—I. The method of relative topography or thickness charts for analyzing the weather situation is advocated for use in Europe especially since European air masses manifest fewer contrasts than North American air masses. The distribution of relative topography in a typical depression, the formation of a depression aloft behind a surface depression in advanced stages of occlusion and the formation of a cold air pool are discussed. II. The effect of the cold air mass upon the relative topography of the 500–1000 mb level and hence upon the absolute topography of the 500 mb surface is discussed with special reference to the specific weather situation of Dec. 2–5, 1950 and Dec. 11–12, 1950. The forecasting significance of the cold air intrusion is considered. *Subject Headings:* **1. Relative topography 2. Differential kinematics 3. Air masses 4. Europe.**—*I.L.D.*

8.1–169 551.509.317:681.14

Bushby, F. H., **The objective analysis of some 500 mb. charts.** *Great Britain. Meteorological Research Committee, M.R.P.*, 986, May 25, **1956.** 5 p. 4 figs., 3 refs., 4 eqs. Mimeo. **DWB**—An experiment was made in analyzing the 500 mb field by electronic computer direct from the observed 500 mb heights or winds, as a basis for time integration. The method is to find the quadratic or cubic surface which best fits the observations. Three situations were analyzed (N. Atlantic and W. Europe). It appears that the objective technique can produce sufficiently smooth and accurate results more quickly than manual plotting; the quadratic surface is considered better than the cubic. *Subject Headings:* **1. Upper air analysis 2. Machine methods.**—*C.E.P.B.*

8.1–170 551.509.317:629.13

Cicala, Aldo, **Un metodo di rappresentazione plastica delle correnti in quota.** [A plastic model for representing upper air wind currents.] *Rivista di Meteorologia Aeronáutica*, Rome

14(3/4):46–47, July/Dec. 1954. fig. **DWB**—Fine removable transparent plastic and glass frames allow representation of winds and isobars at 850, 700, 500, 300 and 200 mb levels above a topographic map of Europe. Panes are 1 cm apart and overall dimensions are 35×40 cm (14″×16″). Red and blue colors can be used for cold or warm air flow. The device is useful in daily briefing of pilots. *Subject Headings:* **1. Synoptic upper air analysis 2. Three-dimensional weather maps 3. Pilot briefing.**—*M.R.*

8.1–171 551.509.317:551.510.52/3

Culkowski, Walter M. (*U. S. Air Force*), **Tropopause analysis and surface forecasting.** *American Meteorological Society, Bulletin*, 37(5):199–204, May 1956. 10 figs., 3 refs. **DWB**—Few forecasters in the field realize the value of tropopause analysis. This article, though general in nature, may serve as an introduction to a few of the theoretical aspects of such analysis as applied to the "Ft. Scott Blizzard" of 1954. Since the tropopause defines the upper limit of tropospheric dynamics, and since elementary tropopause analysis is faster, easier and sometimes more rewarding than the more familiar constant pressure charts, a brief description of the writer's investigations may stimulate some much needed interest in the field. *Subject Headings:* **1. Tropopause analysis 2. Forecasting techniques.**—*Author's abstract.*

8.1–172 551.509.317:681.14

§Johnson, D. H., **Objective analysis.** *Great Britain. Meteorological Research Committee, M.R.P.*, 965, March 31, 1956. 12 p. 15 figs., 3 tables, 4 refs. Mimeo. **DWB**—Time would be saved by machine calculation of a contour height as a quadratic function of geographical coordinates, obtained by fitting a least squares solution to observed heights and winds suitably weighted. This memoir describes preliminary computations using a 6-station network over the British Isles and a 5-station network mainly of weather ships. A cubic surface was also tried. Further work is described by F. H. Bushby in *M.R.P.*, 986, May 25, 1956 (*see* 8.1–169). *Subject Headings:* **1. Upper air analysis 2. Machine methods.**—*C.E.P.B.*

8.1–173 551.509.62:551.574.2

Bouchet, R. (*Inst. Nat. de la Recherche Agron.*), **Contribution à l'étude de la lutte contre les gelées de printemps au moyen d'écrans nuageux.** [Contribution to the study of spring frost prevention by means of artificial clouds.] *La Météorologie*, Paris, Ser. 4, No. 36:403–439, Oct./Dec. 1954. 17 figs., 27 refs., eqs. French, English and Italian summaries p. 403. **DWB**—After determining the quantities of energy necessary to prevent nocturnal cooling, the author tries to define the characteristics of artificial clouds needed to prevent freezing. The results explain past failures and show that it is possible to find an economically valuable solution by means of clouds with hygroscopic condensation nuclei. The theoretical study has not yet been experimentally verified. *Subject Headings:* **1. Artificial clouds 2. Frost prevention.**—*A.M.P.*

ARTIFICIAL PRECIPITATION

See: **[Proceedings and papers] of Symposium on Artificial Rain, 8.1–3.**

STRUCTURE AND PHYSICS OF THE ATMOSPHERE

COMPOSITION OF THE ATMOSPHERE

See also: **Pollution studies** (Calif. Univ., L. A.), 8.1–2; **High altitude navigation** (Poppen), 8.1–103; **Visibility in air pollution studies** (Clayton, Giever), 8.1–363; **Electron-density profiles** (Jackson), 8.1–379; **Electrical conductivity in upper atmos.** (Maeda), 8.1–380; **Radio propagation** (Chvojková), 8.1–394.

8.1–174 551.510:523.4

Firsoff, V. A., **Does water vapour escape from Mars?** *British Astronomical Association, Journal*, 66(2):53–59, Jan. 1956. 10 refs., 5 eqs. **DLC**—Atmospheric conditions on Mars

are set out—composition, temperature, lapse rate, surface pressure (83 mb). The mean altitude of the Martian tropopause is estimated as 30 km and all water vapor is frozen out below this level. The height of the ozone layer is estimated as 75 km; at night ozone may condense and break up into monatomic oxygen. No mechanism for the escape of oxygen and water vapor from Mars yet considered is confirmed. *Subject Headings:* **1. Atmospheric structure 2. Planetary atmospheres 3. Mars.**—*C.E.P.B.*

8.1–175 551.510.3:523.5

Ceplecha, Zd. (*Astronomical Inst. of the Czechoslovak Academy of Sciences*), **Atmospheric corrections to meteor velocities and the atmospheric density gradient.** (In: Kaiser, T. R. (*ed.*), **Meteors.** London, Pergamon Press, **1955.** p. 81–85. tables, 3 refs., 8 eqs.) **DWB**—The original velocity $v\infty$ of a meteor may be calculated by two methods: 1) by extrapolation of the observed velocity-height dependence and 2) by the physical theory of meteors (this has been used exclusively up to the present time). A method of calculating the original velocity $v\infty$ and the density gradient, b, for long bright meteors is derived in the paper from the knowledge of the mean observed velocities and heights at three different points on the meteor trajectory. The Whipple formulas for the calculation of $v\infty$ are given. A new method of calculating the original velocity $v\infty$ of a meteor is derived. This can be used for photographic meteors with smooth light curves. The velocity v_m at maximum light of the meteor and the constant K_m in the mass equation of the Hoppe theory are the only values necessary for the calculation of the original velocity $v\infty$, and these may be derived directly from the measured values. It is not necessary to know the atmosphere density gradient, b, for the calculation of $v\infty$. The gradient b may be calculated from the Whipple formulas by means of directly measured values. *Subject Headings:* **1. Meteor velocity computation 2. Air density effects.**—*Author's abstract.*

8.1–176 551.510.3:551.510.535

Link, F. (*Astrophys. Obs., Ondrejov*), **Variations temporaires et locales de la densité dans la haute atmosphère.** [Temporal and spatial variations of upper atmospheric density.] *Bulletin of the Astronomical Institutes of Czechoslovakia*, Prague, 5(1):1–3, **1954.** tables, 9 refs. Russian summary p. 3. **DLC**—There are three methods available at present for investigating atmospheric density variations in the ionosphere: 1) rocket sounding, 2) meteor observation and 3) twilight sky measurement. With the first method only qualitative results have been obtained according to published reports. Results obtained so far with the other two methods (meteors and twilight sky brightness) are reviewed and compared in this paper. There appears to be a chance of agreement between diurnal and latitudinal variation of ionospheric density as obtained by the two methods. More extensive twilight sky brightness measurements will be necessary in order to obtain data on seasonal variations by this method. *Subject Heading:* **1. Ionospheric density variations.**—*G.T.*

UPPER ATMOSPHERE—IONOSPHERE

See also: **Tropopause analysis** (Culkowski), 8.1–171; **Upper atmos. density variations** (Link), 8.1–176; **Winds in lower E-region** (Greenhow, Neufeld), 8.1–254.

8.1–177 551.510.52/3:551.547:551.524.7(410)

Bannon, J. K., **Long-period averages for the upper air.** *Great Britain. Meteorological Research Committee, M.R.P.*, 978, April 30, **1956.** 6 p. 4 figs., 4 tables, 7 refs. Mimeo. **DWB**—Average monthly tropopause pressures and temperatures and temperatures at 100, 150, 200, 300, 500 and 700 mb, at Larkhill and Lerwick, are given for 1942–53. Estimated values for 1900–39 are calculated from regression equations on surface pressures, resulting in a smoother annual variation. The values are also shown graphically, including extremes or pressure and standard deviations at tropopause. *Subject Headings:* **1. Tropopause pressure 2. Tropopause temperature 3. Upper air temperatures 4. Great Britain.**—*C.E.P.B.*

8.1–178 551.510.53

Paetzold, Hans-Karl, **Das heutige Bild der Stratosphäre.** [The present picture of the stratosphere.] *Umschau*, 56(17):528–531, Sept. 1, **1956.** 5 figs. **DLC**—In this useful summary the characteristics of the stratosphere are set out and methods of investigation by sound waves, balloons and rockets described. Ozone and water vapor content to 30 km, temperature to 100 km and wind direction and speed to 70 km are plotted. *Subject Heading:* **1. Stratosphere.**—*C.E.P.B.*

8.1–179 551.510.534:550.384

Malurkar, S. L., **Geomagnetic variations and diurnal range of atmospheric ozone.** *Annali di Geofisica*, 7(2):209–213, April **1954.** 3 figs., 5 refs. **DLC**—The relationship of the variation of the diurnal range of atmospheric ozone and the mean world geomagnetic K figures as measured at Tromsö and Bear Island, respectively, are analyzed. The daily figures of diurnal ozone variations in units of 0.001 cm and the daily sum of 3 hour character figures are presented in graphs. It is seen that when the values of diurnal range of atmospheric ozone increase the magnetic character sum also increases, but while the latter, after having increased, takes some days to return to its normal or original value the former drops back rapidly. *Subject Headings:* **1. Ozone variations 2. Geomagnetic variations.**—*I.L.D.*

8.1–180 551.510.535:551.594.12:523.5

†Dubin, Maurice (*GRD, AFCRC, Bedford, Mass.*), **Meteor ionization in the E-region.** (In: Kaiser, T. R. (*ed.*), **Meteors.** London, Pergamon Press, **1955.** p. 111–118. table, 13 refs., eq.) **DWB**—The theories of meteoric interaction with the atmosphere have been reviewed to determine the total contribution by meteors to the ionization content of the E region. From HERLOFSON's theoretical treatment of this interaction, and WATSON's distribution of the size and numbers of meteoric particles entering the atmosphere per day, the number of electrons produced at various altitudes in the E region was computed. These computations indicated that most of the ionization at higher altitudes resulted from meteors of large visual magnitude. Since, as WHIPPLE has shown, the ablation process would probably not occur in the case of micrometeorites because of heat loss by radiation, the collision processes for ionization were reviewed; it seems that the ionization process is mainly a function of the relative energy of the collision, and therefore ablation prior to ionization would not be required for small particles. Using the value (of Greenhow and Hawkins, 1952) for the efficiency of the ionization process and the recently revised value for the amount of meteoric material entering the atmosphere per day, the rate of production of electrons was found to be 20 electrons/cc sec. From this value and the recombination coefficients in the E region, the equilibrium electron density in the E region was found to be between 2×10^4 and 7×10^4 electrons/cc. It is therefore proposed that the night-time value for the electron density in the E region results from meteoric bombardment, and that sporadic E is caused by the same process on the assumption that the distribution of meteoric particles in space is nonisotropic and contains centers of high density. Perhaps, also, the interaction of charged micrometeorites with the earth's magnetic field, may be considered as a mechanism for the production of magnetic storms. *Subject Headings:* **1. Meteor ionization 2. E layer ionization.**—*Author's abstract.*

8.1–181 551.510.535:551.521.64

Lauter, E. A.; Bartels, G.; Sprenger, K. and Skeib, G., **Der Intensitätsanstieg der kosmischen Strahlung am 23.2.1956 und gleichzeitige Effekte in der tiefen Ionosphäre.** [The increase of intensity of cosmic radiation on Feb. 23, 1956 and simultaneous effects in the lower ionosphere.] *Zeitschrift für Meteorologie*, 10(5):129–131, May **1956.** fig., 3 refs. **DLC**—The increase of cosmic radiation shown by observations at Kühlingsborn began at 0342 GMT and by 4–5 h exceeded 65%, the limit of the electrometer; it probably reached 150%. It powerfully affected long wave transmission (35–40 kHz) in the nocturnal D region. Disturbances on 40–5 kHz at Kühlingsborn and Potsdam are shown graphically. On 185 kHz there was a sudden increase of absorption at 0348 GMT which continued to midday, also found on 245 and 1178 kHz. Next day there was an intensity rise of 6.2% at 12–13h. *Subject Headings:* **1. Cosmic-ray variations 2. D layer 3. Kühlingsborn, Germany.**—*C.E.P.B.*

MECHANICS AND THERMODYNAMICS OF THE ATMOSPHERE

See also: **Atmos. circulation** (Raethjen), 8.1–6; **Divergence equation** (Watanabe), 8.1–166; **Baroclinic instability** (Charney), 8.1–192; **Subtropical jet stream** (Ramaswamy), 8.1–202; **Weather and indicators of vertical motion** (Sanders), 8.1–258.

8.1–182 551.511:551.509.319:629.1

Frank, S. R., **On the use of constant absolute vorticity trajectories.** *Trans World Airline K.C., Mo., Meteorological Technical Bulletin*, No. 51-1, Feb. 20, **1951.** 4 p. figs. **DWB-** Notes on the use of ROSSBY's simple theory regarding constant absolute vorticity trajectori in synoptic analysis and hence in flight planning. Cautions as well as restrictions are outline This theory ignores convergence, divergence, inversions and temperature advection. Neve theless it is useful as an aid in developing prognostic charts. *Subject Headings:* **1. Consta vorticity trajectories 2. Rossby's vorticity theory 3. Aviation forecasts.**—*M.R.*

8.1–183 551.511:551.515.1:551.515

§Kruhl, Heinrich, **Trog, umgebogene Okklusion, sekundäre Kaltfront, 1 Teil.** [Troug bent-back occlusion, secondary cold front, Pt. 1.] *Annalen der Meteorologie*, Hambur 6(11/12):321–341, **1953/54.** 39 figs., 8 refs. German and English summaries p. 321. **DWB-** The development of the Dutch "hurricane" of Jan. 31–Feb. 1, 1953, was due partly to a upper cyclone but much more to a vortex in the lower troposphere. The two came togeth over the southwest North Sea and Dutch coast, accounting for the position and intensity the surface cyclone. The development is shown by surface charts and topography an isotherms of levels from 850–200 mb, and a series of isentropic sections. The cyclonic develo ment in the rear of the trough is explained by a cold tongue which became an isolated ma above 600 mb moving SE. The factors in the development of rotation are calculated. Th rapid deepening over the North Sea is attributed to incomplete dynamic and thermal con pensation. Upglide of the warm air resulted in a bent-back occlusion. *Subject Heading* **1. Cyclone development 2. Storm floods, North Sea (Feb. 1953) 3. Netherlands.**—*C.E.P.*

8.1–184 551.511:551.5

Phillips, O. M. (*Trinity College, Cambridge*), **Final period of decay of non-homogeneou turbulence.** *Cambridge Philosophical Society, Proceedings*, 52(1):135–151, Jan. **1956.** fig 5 refs., numerous eqs. **DLC**—In this paper, a study is made of the properties of the motio due to a general localized disturbance in an infinite fluid initially at rest. Two invariants the motion are found, which are identified with the net linear momentum, or effective dipo strength, and the net angular momentum imparted to the fluid, and an equation is derive expressing the rate of change of the effective quadrupole strength of the motion. Solutions a obtained for the final period of decay of such a motion, and it is shown that, when the n linear momentum of the fluid is non-zero, the motion corresponds to a type of viscous vorte ring. The length scale increases with time t as $[\nu(t-t_o)]^{1/2}$, and the total energy decays $[\nu(t-t_o)]^{-3/2}$, where ν is the kinematic viscosity and t_o is a virtual time origin. If the n momentum is zero, the total energy decays as $[\nu(t-t_o)]^{-5/2}$, and expressions are given for t velocity field in this case also. It is shown that, if it is attained, the final period of *any* turbule motion can be found from the vortex ring type of solution described above. The final peri of homogeneous turbulence is clearly one particular example of such a motion. The fin period of an axially symmetrical turbulent wake is treated in this way and is shown to consi generally of the superposition of two types of motion: (i) a mean streaming motion who energy per unit length of the wake decreases as $[\nu(t-t_o)]^{-1}$, and (ii) a superimposed fluctuati motion whose energy per unit length decays as $[\nu(t-t_o)]^{-5/2}$. Expressions are given for t distribution of mean-square vorticity and the energy spectrum tensor in the wake. *Subj Headings:* **1. Turbulence decay 2. Atmospheric motion.**—*Author's abstract.*

8.1–185 551.511:551.524:551.5

§†Rusin, N. P., **Metodika nabliudenii nad teplovym balansom podstilaiushcheĭ poverkhno na gidrometeorologicheskikh stantsiiakh.** [Method of observing the thermal balance of t surface underlying the lower air layer at hydrometeorological stations.] *Leningrad. Glavna*

Geofizicheskaia Observatoriia, Trudy, No. 34(96):5–29, **1952.** 5 figs., 12 tables, 23 refs., 24 eqs. **DLC**—Beginning with a brief discussion of the equation of thermal balance, the author then discusses the theoretical and experimental aspects of methods for determining 1) heat exchange in the soil, and 2) heat exchange between the soil surface and the atmosphere, the evaluation of existing methods of determining the coefficient of turbulence from the point of view of their use made in hydrometeorological stations, methods for determining the heat expended by evaporation or liberated during condensation. Also a detailed discussion is given of the procedure and apparatus employed at hydrometeorological stations for measuring the gradient of air temperature and humidity and wind velocity in the lower 10–15 m of the atmosphere including diagrams of the apparatus and the results of actual measurements being presented in tables and as profiles. *Subject Headings:* **1. Heat balance 2. Heat exchange 3. Soil-air heat exchange 4. Meteorological instruments.**—*I.L.D.*

8.1–186 551.511:551.515.11

§*Spar, Jerome; Fisher, Edwin L.; Paroczay, Ernest and Peterson, Roy E., **Vorticity changes in an east coastal cyclone.** New York Univ. College of Engineering. Research Div., Contract Nonr-285(09), Progress Report, No. 2, July **1955.** 36 p. 14 figs., 8 tables, 8 refs. **DWB**—In this report the quantitative analysis of the 500 mb vorticity changes in the East Coast cyclone of Dec. 9–11, 1952 as treated in **Progress Report,** No. 1 (Spar et al. 1955; *see* 8.2–131, Feb. 1955, *MAB*) has been extended to cover the changes at 700, 400 and 300 mb, using the trajectory technique. Five cross sections drawn along the 500 mb streamlines passing through the center of maximum vorticity are presented for levels from 850 to 200 mb showing upward and downward distributions of vertical velocity and vorticity. It was found that the largest vorticity changes occur near 400 mb, and that advection accounts for about 50% of the variation of local vorticity at almost all levels. Synoptic analysis indicates that vorticity may be carried downward by large scale sinking motions, and tipping may be a factor near 500 mb. *Subject Headings:* **1. Vorticity analysis 2. Cyclogenesis 3. Cyclone, East Coast (Dec. 1952).**—*M.R.*

8.1–187 551.511:533.7

Starr, Victor P., **On the production of kinetic energy in the atmosphere.** *Journal of Meteorology*, 5(5):193–196, Oct. **1948.** 4 refs., 12 eqs. **DWB.** Also his: **Transport of kinetic energy in the atmosphere.** *Ibid.*, 6(2):160, April **1949.** eqs. **DWB.** First article also issued as: Massachusetts Institute of Technology. Dept. of Meteorology, Contract AF 19(122)-153, Studies of the Atmospheric General Circulation, Final Report, Pt. 1, May 31, **1954,** p. 13–16. Second article, *Ibid.*, p. 17.—The production of kinetic energy in the atmosphere is examined from a hydrodynamical point of view. The results indicate that the intensity of the primary source of horizontal kinetic energy at any point in the atmosphere is equal to the pressure multiplied by the horizontal divergence of the velocity. Regions of horizontal velocity convergence appear as hydrodynamical sinks for kinetic energy, in addition to frictional effects. It is found that kinetic energy may be transferred through advection and through work done by pressure forces. It appears that diverging anticyclones are of primary importance in providing kinetic energy for the general circulation. 2) Transfer of kinetic energy of horizontal motions across the boundary of a region which is not mechanically closed may be brought about by advection of existing kinetic energy and through the work done by pressure forces in virtue of the components of horizontal velocity across the boundary. *Subject Headings:* **1. Kinetic energy in atmosphere 2. Hydrodynamics.**—*Author's abstract.*

8.1–188 551.511:551.577(54)

Venkataraman, K. S. (*Regional Met. Center, Bombay*), **Study of Sutcliffe's theory of development in relation to rainfall in Indian area.** *Indian Journal of Meteorology and Geophysics*, Delhi, 6(1):51–56, Jan. **1955.** 3 figs., 2 tables, 5 refs. **DWB, DLC**—Computation of SUTCLIFFE's development term over the Indian area in three synoptic situations during the S.W. monsoon season shows that, in spite of the various limitations in applying the theory to subtropical regions, the areas of heavy rain coincide with the areas of maximum development. *Subject Headings:* **1. Sutcliffe's development theory 2. Divergence forecasting 3. Rainfall forecasting 4. India.**—*Author's abstract.*

GENERAL CIRCULATION

See also: **High-pressure areas** (Teich), 8.1–242; **Atmos. circulation during latest glacial period** (Majdanowski), 8.1–321; **Continentality, Argentina** (Schwerdtfeger, Vasino), 8.1–350.

8.1–189 551.513:536.1

Onishi, Gaishi (*Tôhoku Univ., Geophysical Inst.*), **Influence of heat sources and sinks distributed vertically over the large scale atmospheric disturbances.** *Tôhoku Univ. Science Reports, 5th Ser., Geophysics,* 7(2):51–60, Nov. **1955.** 3 figs., table, 8 refs., 28 eqs. **DWB, DLC**—In order to study the thermal effect on the planetary waves, the model considered here is such that heat sources, represented by the sensible heat, are distributed in the lower atmosphere, and heat sinks, due to radiative cooling, in the upper layer, and that the motion is frictionless. By numerical computation it is concluded that the thermal effect is so small that it can be neglected in small time intervals. But in view of the maintenance of the long stable planetary waves, the thermal effect seems to be important in amplifying the waves in opposition to the frictional decay effects. The effect of the stratosphere is also studied. It seems that the single layer approximations with the respective simplifications of the finite atmosphere, bounded by two rigid surfaces, and of the infinite atmosphere are not satisfactory for unstable cyclonic waves. *Subject Headings:* **1. Heat sources and sinks 2. Atmospheric disturbances.**—*Author's abstract.*

8.1–190 551.513.1:551.571:551.515

Bradbury, Dorothy L., **An experiment in stability and moisture analysis.** Chicago Univ. Dept. of Meteorology, Contract AF 19(604)-1293, Scientific Report, No. 8, April **1956.** 33 p. 13 figs., 3 tables, 4 refs., 2 eqs. **DWB**—A detailed study was made of the integrated patterns of water vapor content and of the convergence of water vapor into the area surrounding a developing extratropical cyclone in order to relate them to the observed patterns of clouds and precipitation. The vertical distribution of water vapor transport through the walls of polygons surrounding the storm center showed that the maximum transport is generally below 800 mb. The configuration of the area defined by a limiting saturation deficit (5°C or less) in a representative layer in the lower troposphere and the corresponding cloud and precipitation areas were in good agreement. Patterns of several indices of static stability and of isobaric tendencies showed fair agreement with the corresponding rainfall patterns. *Subject Headings:* **1. Water vapor transport 2. Extratropical cyclone development 3. Static stability.**—*Author's abstract.*

8.1–191 551.513.1

Breistein, P. M. and Parry, H. Dean, **Some dynamical aspects of static stability.** *Monthly Weather Review,* Wash., D. C., 82(12):355–359, Dec. **1954.** 4 figs., table, 3 refs. **DWB**—The relation between static stability of the atmosphere and wave length of flow patterns is investigated for two sets of data: (1) Northern Hemispheric charts for a 10-day period, Dec. 26, 1952–Jan. 4, 1953 and (2) U. S. charts for Feb. 15–June 1, 1953. Results for the first set of data appear to indicate a dynamically significant relation between the wave length at 400 mb and the ratio of square root of mean stability to mean Coriolis parameter. Over the United States, this relationship does not appear to be sufficiently strong to be of direct applicability in forecasting. (For similar title, *see* 6.6–169, June 1955, *MAB.*) *Subject Headings:* **1. Dynamics of the atmosphere 2. Static stability 3. Coriolis force 4. Northern Hemisphere.** —*Authors' abstract.*

8.1–192 551.513.1:551.511

Charney, Jule G., **On baroclinic instability and the maintenance of the kinetic energy of the Westerlies.** *International Union of Geodesy and Geophysics. Association of Meteorology, 9th, Brussels, Aug. 1951, Assemblée Générale, Mémoires et Discussion,* p. 47–63, pub. **1953.** 2 figs., refs., eqs., bibliog. p. 63. Its *Publication AIM* No. 9/c. Abstracted from reprint. **DWB**—The author attempts to show that eddies that form in a linear current approximating the mean state of the atmosphere must necessarily act as agents to restore the

mean kinetic energy. A semi-empirical method is employed to investigate the stability properties of linear baroclinic currents that resemble the jet-like mean zonal flow of the atmosphere. It is found that horizontal shear exerts a stabilizing effect, but that the flow is unstable for perturbations on the scale of the developing upper air wave. The unstable wave perturbations are shown to be effective eddy transfer agents in maintaining the kinetic energy of the westerlies against frictional dissipation. *Subject Headings:* **1. Baroclinic instability 2. Waves in the westerlies 3. Kinetic energy.**—*Author's abstract.*

8.1–193 551.513.1:551.557

Gazzola, Adriano, **La corrente a getto durante una situazione di blocco.** [Jet stream during a blocking situation.] *Rivista di Meteorologia Aeronautica*, Rome, 15(1):25–31, Jan./March **1955.** 6 figs. English, French and German summaries p. 25. **DLC.** (Also in: Italy. Servizio Meteorologico dell'Aeronautica, **Il Servizio Meteorologico dell'Aeronautica Italiana alla X Assemblea Generale U.G.G.I., Rome, 1954.** p. 45–52. English summary p. 45.) **DWB**—A blocking situation over the North Atlantic in Jan. 1950 is examined and compared with a simultaneous jet wave the evolution of which appears to be closely connected with the basic field evolution. The relationship between tropopause level variations and jet stream occurrence as a manifestation of close relationship between wind field and temperature is pointed out. *Subject Headings:* **1. Jet stream 2. Blocking action 3. North Atlantic.** —*I.L.D.*

8.1–194 551.513.1

†Hawkins, Harry F. (*Extended Forecast Sec., U. S. W. B., Wash., D. C.*), **The weather and circulation of June 1955: illustrating a circumpolar blocking wave.** *Monthly Weather Review*, Wash., D. C., 83(6):125–131, June **1955.** 5 figs., 17 refs. **DWB, DLC**—Blocking conditions were present in the hemispheric weather pattern throughout the first half of 1955, but were especially prominent in June, when unusually cold weather and one of the lowest zonal indexes on record (for 5 days) occurred. The blocking could be traced twice around the hemisphere on the 700 mb chart. Details are shown in charts and diagrams and discussed. Temperature persistence between April and May 1955 was high whereas usually reversals occur (98% of stations showed 0+1 class change in 1955), while from May to June only 35% persistence of 1/2 normal was noted. *Subject Headings:* **1. Blocking waves 2. Temperature persistence 3. Cool summers 4. United States 5. Northern Hemisphere.**—*M.R.*

8.1–195 551.513.1:551.515.13(74)

§Robinson, Earl F. and Joseph, Ellis J. (both, *National Weather Analysis Center, U. S. W. B. Suitland, Md.*), **The effect of a blocking high on two consecutive lows over the central United States, June 7–11, 1955.** *Monthly Weather Review*, Wash., D. C., 83(6):132-136, June **1955.** 6 figs. **DWB, DLC**—A blocking high moved into the N.E. part of North America from the N. Atlantic in the first week in June, diverting surface cyclones well to the north of the usual track for the season. The 500 mb height anomaly and 1000-500 mb thickness anomalies on June 7–11, 1955 are analyzed and illustrated, and their relation to 300 mb lows and positions (each day at 0300 and 1500Z) of centers are compared with NWAC, 36 hr 500 mb and JNWP 36 hrs 400 mb prognostic positions for period from 6th to 13th of June. This is the first article using JNWP operational forecasts in the analysis. *Subject Headings:* **1. Blocking action 2. Cyclone tracks 3. Eastern United States.**—*M.R.*

8.1–196 551.513.1

Starr, Victor P. and White, Robert M. **Two years of momentum flux data for 13°N.** (In: Massachusetts Institute of Technology, Dept. of Meteorology, Contract AF 19(122)-153, Studies of the Atmospheric General Circulation, Final Report, Pt. 1, May 31, **1954.** p. 159–162. 3 tables, 2 refs.) **DWB**—Statistical results, concerning the meridional flux of angular momentum in the tropics are presented. The data are in satisfactory agreement with a previously published paper (*see* 4.2–104, Feb. 1953, *MAB*). Eleven % of the momentum transport is accomplished through mean meridional circulation. *Subject Headings:* **1. Angular momentum flux 2. Meridional circulation 3. Tropics.**—*A.A.*

8.1–197 551.513.1 551.506(73)

Woffinden, Charles M. (*Ext. Fore. Sec., U. S. W. B., Wash., D. C.*), **The weather and circulation of May 1955: alleviation of drought in the Midwest.** *Monthly Weather Review* Wash., D. C., 83(5):104–109, May **1955.** 6 figs., 6 refs. **DWB**—The month of May continued the pattern of the past 2 months with regard to temperature (very cold in west and northwest; warm east of Divide) instead of reversing the pattern as is most often the case between April and May. The rains which occurred in late May in the southwest broke the drought that had existed for 8 months (Sept. 1954–April 1955). The mean trough (700 mb) for the month was well inland over Idaho and southern California. In the east heights were above normal, with a blocking regime over Davis Straits and East Asia, and the jet stream well south of normal in these regions. *Subject Headings:* **1. Cold springs 2. Atmospheric circulation anomalies 3. Drought, Southwestern United States** (1954–5).—*M.R.*

8.1–198 551.513.2:551.557

de Pasquale, Oreste, **Idee ed applicazioni precorritrici di oltre 30 anni addietro sulle "correnti a getto."** [Ideas and applications of the jet stream theory 30 years ago.] *Rivista di Meteorologia Aeronautica*, Rome, 15(2):32–34, April/June **1955.** Italian, French, German and English summaries p. 32. **DLC**—The writer points out that, in some papers concerning the atmospheric currents over the Straits of Messina, dating back to 1923, he had himself called the attention of his fellow-students to the theoretical and practical importance of strong westerly air currents observed there, which are obviously identical with what we now call a "jet stream." *Subject Heading:* **1. Jet stream theory.**—*Author's abstract.*

8.1–199 551.513.2 551.515.8:523.74

†Gregor, Z. and Křivský, L., **Kolísání frontální zony v oblasti Atlantiku a Evropy během roku a ve vztahu k sluneční aktivitě.** [Variation of the frontal zone during the year in the area of the Atlantic and Europe in relation to solar activity.] *Meteorologické Zprávy*, Prague 5(5):122–121, **1952.** 4 maps, 15 refs. English summaries p. 122, 125. **DLC.** English version in: *Ondřejov. Astrofysikální Observatoř, Publikace*, No. 23:5–35, **1953.** Russian summary p. 33–34. **DWB**—In certain months the mean condition of the circulation may be illustrated quite well by the mean position of a frontal zone. The position of the frontal zone is a complement of the pressure distribution. The secular variation of the mean position of frontal zone is determined and related to the solar activity expressed by EIGENSON's index *A* of sunspot occurrence. Especially marked effects are found for Jan., April and July. The results presented on maps are expressed as deviations from the mean frequency of frontal zones. The deviations were determined for years of minimum and maximum sunspot occurrence. *Subject Headings:* **1. Frontal zone variation 2. Sunspot effects 3. Circulation patterns.**—*Author's abstract.*

8.1–200 551.513.2:551.515

Izawa, T., **On damping waves in the westerlies.** *Journal of Meteorological Research* Tokyo, 4(2):51–57, May **1952.** 4 refs., 40 eqs. In Japanese; English summary p. (3). **DWB**—Starting from a basic equation for frictional motion caused by Grossaustausch in a barotropic nondivergent atmosphere the author develops a stream function and an equation for temperature distribution in a damping wave and, finally, arrives at an expression of amplitude and phase differences between stream line and isothermal line, which agrees with results obtained by ROSSBY. The principal equations are given in the English summary. *Subject Heading:* **1. Waves in the westerlies.**—*G.T.*

8.1–201 551.513.2:551.557(54)

Koteswaram, P. and Parthasarathy, S., **The mean jet stream over India in the pre-monsoon and post monsoon seasons and vertical motions associated with sub-tropical jet streams** *Indian Journal of Meteorology and Geophysics*, 5(2):138–156, April **1954.** 26 figs., 5 tables 15 refs., 5 eqs. **MH-BH**—The mean jet stream over the Indian subcontinent has been calculated for the post- and pre-monsoon season. This study involved an analysis of: 1) the thermal structure of the upper troposphere in the post-monsoon and pre-monsoon periods (seasonal mean temperatures for various elevations and localities are given in tables and mean

onstant temperature charts for the various months are shown); 2) the mean contour topogaphy of various standard pressure levels; 3) mean meridional cross sections; 4) monthly ariation of the jet stream; 5) the tropopause and the jet stream; 6) the thermodynamical spects of the jet stream; 7) vertical motion in the vicinity of jet streams; 8) horizontal divergence over India; 9) vertical motion over India (adiabatic method); 10) mechanism of the et stream; and 11) clear air turbulence near the subtropical jet. *Subject Headings:* **1. Jet tream profiles 2. Vertical motion 3. India.**—*I.L.D.*

8.1–202 551.513.2:551.511:551.557 551.509.317:551.515.3/4(54)

Ramaswamy, C. (*Int. Met. Inst., Stockholm*), **On the subtropical jet stream and its role n the development of large-scale convection.** *Tellus*, Stockholm, 8(1):26–60, Feb. **1956.** 0 figs., 45 refs., 2 eqs. **DLC**—This paper contains mainly the results of a synoptic and limatological study of the large-scale convection in northern India and Pakistan during the hree months preceding the onset of the southwest monsoon. It has been shown that the sea-evel and lower tropospheric charts give little clue to the development of the large-scale convection and that the latter is overwhelmingly determined by the divergence in the waves in he subtropical jetstream. It has further been shown from detailed synoptic evidence that or'westers, andhis and the majority of the thunderstorms without squalls in northern India nd Pakistan in the pre-monsoon period are fundamentally the same phenomenon. The role f cold-air advection in the middle and upper troposphere in the development of large-scale onvection has also been discussed. This study has further revealed that the regions of upper-livergence and convergence can be qualitatively located by identifying certain typical patterns n the high-level maps more than 12 hrs before the usual time of commencement of convection nd that, consequently, these maps can be used as effective tools in the issue of area-warnings gainst thunder in general and nor'westers and andhis in particular. A general study has lso been made of the large-scale convection in southeast Australia, Union of South Africa, Bechuanaland, Southern Rhodesia, northeast Argentina, Uruguay, southeast Brazil and southast United States and the similarities between the large-scale convection in these countries nd in Indo-Pakistan have been brought out. On the basis of these studies, it has been sugested that the jet stream plays the very important role of producing large-scale convection n the subtropics all over the world wherever it overruns, on its equator-ward side, moist air ossessing a high degree of latent instability. *Subject Headings:* **1. Convective activity 2. Jet tream 3. Squall forecasting 4. Thunderstorm forecasting 5. India.**—*Author's abstract.*

8.1–203 551.513.3:551.515.1

Nakamura, N., **Divergence analysis of the Aleutian Low [Studies on the Aleutian Low Pt. 1].** *Journal of Meteorological Research*, Tokyo, 7(8):455–461, Oct. **1955.** 8 figs., 4 refs., eqs. In Japanese; English summary p. 455. **DWB**—This is a preliminary report of author's ynoptical and dynamical studies on the Aleutian low in winter season. The principal results re as follows: (1) The migratory cyclone develops rapidly over the N. Pacific (50°N, 170°E), y supply of many vortices from surrounding vorticity field. (2) The lower air mass in the yclone was divided into 3 parts by the difference of trajectories of air particles near the surface. They were a warm air mass, a cold air mass and a neutral one. (3) The time variation and orizontal distribution of air temperature in the cyclone were well explained by the trajectories f air mass. (4) The horizontal distribution of the divergence and convergence in the lower art of the cyclone was calculated using the vorticity equation. (5) The divergence area and he convergence area were compared with weather, and it was found that the divergence area orresponds to less amount of cloud area and the convergence area to the bad weather area. *Subject Headings:* **1. Aleutian Low 2. Divergence analysis 3. Convergence and divergence . North Pacific.**—*Author's abstract.*

8.1–204 551.513.7 551.579.4

Andrews, James F. (*Extended Forecast Sec., U. S. W. B., Wash., D. C.*), **The weather nd circulation of December 1955: a month with a major Pacific block and contrasting exremes of weather in the United States.** *Monthly Weather Review*, Wash., D. C., 83(12):327–35, Dec. **1955.** 9 figs., 3 tables, 8 refs. **DWB**—In addition to circulation and weather nomalies, the California floods of Dec. 1955, and heavy precipitation elsewhere N. and N.E.

(and dry weather to S. and E. of San Francisco Bay area and in Great Plains) are discussed, with supporting data and charts. Cold weather occurred over most of the country in the first 2 weeks, but warm weather replaced the cold during the last fortnight. Anomalous weather resulted from southward displacement of jet stream between Hawaii and Oregon. *Subject Headings:* **1. Atmospheric circulation anomalies 2. Floods, California (Dec. 1955) 3. Jet stream anomalies 4. United States.**—*M.R.*

8.1–205 551.513.7

Rubin, Morton J., **An investigation of relationships between Northern and Southern Hemisphere meteorological parameters.** *South Africa. Weather Bureau, Notos,* 4(2):122–126, **1955.** 6 tables, 11 refs. **DWB**—A variety of circulation indices and regional indices are utilized to measure the degree of interrelation between the northern and southern hemispherical circulations. The lack of a complete network of stations makes difficult the determination of the existence of an interrelation. Some evidence exists, however, that the Southern Hemisphere circulation may influence the Northern Hemisphere in July. It is also suggested that the Northern Hemisphere circulation may act upon the Southern Hemisphere in Jan. *Subject Headings:* **1. Atmospheric circulation anomalies 2. Inter-hemispheric circulation relationships.**—*Author's abstract.*

ATMOSPHERIC DISTURBANCES

See also: **Trough, occlusion, cold front** (Kruhl), 8.1–183; **Vorticity changes** (Spar, others), 8.1–186; **Stability and moisture analysis** (Bradbury), 8.1–190; **Damping waves** (Izawa), 8.1–200; **Subtropical jet stream** (Ramaswamy), 8.1–202; **Aleutian low divergence analysis** (Nakamura), 8.1–203; **Inversion in high-pressure areas** (Michalczewski), 8.1–235; **Upper air temp. distribution** (Noguchi), 8.1–237; **Wind damage** (Flora), 8.1–252; **Cloud and active warm fronts** (Sawyer, Dinsdale), 8.1–283; **Daily precip. amounts** (Suzuki, Tomatsu), 8.1–287; **Sferics due to fronts** (Kimpara), 8.1–389; **Weather and long-distance ultra-short wave reception** (Louter, Klinker), 8.1–397; special bibliography on **Solar relations with weather,** p. 95.

8.1–206 551.515.3

Fujiwhara, Sakuhei, **The vortex motion, laws of equality and inequality, the principle of birth, growth and death.** *Geophysical Magazine,* Tokyo, 22(4):335–353, Aug. **1951.** Append. **DWB, DLC**—A philosophy of vortexes, as seen from an Oriental point of view. The author distinguishes between the western approach with simplified laws and the Oriental work, which studies the smallest detail. *Subject Heading:* **1. Vortexes.**—*A.A.*

8.1–207 551.515.3(774,744)

Hart, George, **A tale of two tornadoes.** *QST,* West Hartford, Conn., 37(9):45–47, 110, 112, 114, Sept. **1953.** illus. **DWB**—The facts about the Flint, Mich., and Worcester, Mass., tornadoes of June 8 and 9, 1953, and the role played by amateur radio operators and local stations in handling the vast amount of emergency messages and warnings and in assisting the Red Cross and other disaster agencies in relief work. Mobile radio stations were used in the immediate disaster area to handle communications. *Subject Headings:* **1. Tornado, Flint, Mich. (June 1953) 2. Tornado, Worcester, Mass. (June 1953) 3. Flint, Mich. 4. Worcester, Mass.**—*M.R.*

8.1–208 551.515.3

§Hornstein, R. A., **The White Point Beach, Nova Scotia, tornado of January 1954.** *Weather,* 9(8):247–248, Aug. **1954.** fig., plate, 2 refs. **DWB**—Weather chart for tornado at freak hour of 11:40 p.m. A.S.T. on Jan. 30, 1954, with description of weather and photo of damage. *Subject Headings:* **1. Tornadoes 2. Tornado, Nova Scotia (1954) 3. Nova Scotia, Canada.** —*C.E.P.B.*

8.1–209 551.515.3(09)(264)

Hounam, C. E., **Water spout of 1497.** *Australian Meteorological Magazine,* Melbourne, No. 4:36–37, Aug. **1953. DWB**—Luiz de Camões wrote an epic of Portugal, **Os Lusiadas,** (prior to 1561) which describes Vasco da Gama's exploits in 1497–1498 on voyage to India.

Canto 5 describes storms, fog and waterspout encountered before land was sighted off Cape of Good Hope. Seven stanzas translated by J. J. AUBERTIN (1878) are reproduced. *Subject Headings:* **1. Waterspouts 2. South Atlantic 3. Gama, Vasco da. I. Camões, Luiz de II. Aubertin, J. J.** (*trans.*).—*M.R.*

8.1–210 551.515.3(773)

Jensen, James, **In the path of a twister.** *Grain Quarterly*, St. Paul, Minn., 2(3):25–29, Oct. **1953.** photos. **DWB**—A descriptive account of a tornado and of the resulting destruction in Vermillion County, Ill. *Subject Headings:* **1. Tornado observations 2. Vermillion County, Ill.**—*A.A.*

8.1–211 551.515.3

Lawrence, E. N., **Whirlwind at Southend-on-Sea, August 10, 1953.** *Meteorological Magazine*, London, 83(979):4–9, Jan. **1954.** 4 figs., 2 tables. **DWB**—A small whirlwind lasting about a minute occurred on coast slope normal to sun's rays. Attributed to convectional instability released by cool wind from sea. Passed out to sea as a waterspout and broke up. *Subject Headings:* **1. Whirlwinds 2. Southend-on-Sea, Eng.**—*C.E.P.B.*

8.1–212 551.515.3

McMillin, Bob, **Safety—a new twist for tornadoes.** [Reprint, on one sheet, of 8 articles that appeared in the] *Oklahoma City Times*, April 1–10, **1953.** diagrs. Reprinted, Wash., D. C., May **1954. DWB**—A practical illustrated guide for identifying tornadoes and distinguishing them from harmless clouds. A list of 13 safety rules is suggested for use during storms. *Subject Heading:* **1. Tornadoes.**—*G.T.*

8.1–213 551.515.3

Markgraf, Hans, **Ein Beitrag zu Wegener's mechanischer Tromben Theorie.** [Contribution to Wegener's mechanical theory of tornadoes.] *Meteorologische Zeitschrift*, 45(10): 385–388, **1928.** refs. **DWB**—Translation into English by Paul C. Kangieser, issued by U. S. Weather Bureau, Oct. **1954.** Typescript. **DWB**—Comments on WEGENER's paper (*see* E-46, May 1950, *MAB*) which developed the theory that tornadoes occur when strong convective currents penetrate a layer of strong wind shear. The model allows two tornadoes to form in such a cloud—one with cyclonic (to the right) and one with anticyclonic vorticity (to the left). The latter are inhibited in several ways—hence the preponderance of cyclonic tornadoes. A horizontal roll cloud or vortex across the cloud is also predicted, though this occurs in late stages and may be absent. Numerical estimates of slant upward speeds or vertical velocities are given (some from actual cases) to test the order of magnitude of the forces. *Subject Headings:* **1. Tornado theory. I. Kangieser, Paul C.** (*trans.*) **II. Wegener, Alfred.**—*M.R.*

8.1–214 551.515.3(47)

Matyshevskiĭ, G. V., **Smerch v Tuapse.** [A waterspout at Tuapse.] *Priroda*, Moscow, 44(6):116–117, June **1955.** fig. **DLC**—A description with the aid of a drawing of three waterspouts observed at Tuapse, on the shores of the Black Sea on Aug. 13, 1954, at 15 o'clock. The meteorological conditions associated with the waterspouts and the development and characteristics of the waterspouts are described. *Subject Headings:* **1. Waterspouts 2. Tuapse U.S.S.R.**—*I.L.D.*

8.1–215 551.515.3(521.61)

§Ota, Y. and Sawairi, S., **Tornado on 2 November 1951.** *Journal of Meteorological Research*, Tokyo, 5(3):135–141, March **1953.** 6 figs. In Japanese; English summary p. 135. **DWB**—Description with weather charts, records and photographs of a tornado which occurred at 23 h on Nov. 2, 1951 along the coast of Suruga Bay, causing severe damage to houses and trees. The damage was excessive compared to the intensity of the tornado. The tornado formed by excitation by a cold front, which, in crossing the table-land caused a gust exceeding 50 m/sec in instantaneous wind velocity. This was the main cause of the extensive damage. *Subject Headings:* **1. Tornado damage 2. Honshu, Japan.**—*Authors' abstract.*

U. OF I.
LIBRARY

8.1–216 551.515.3(492) 551.553.8(492)

Postma, K. R., **Wind- en water-hozen op 9 Augustus 1955.** [Wind- and water-spout of Aug. 9, 1955.] *Hemel en Dampkring*, The Hague, 53(10):185–189, Oct. **1955.** 8 photos. **DLC, DWB**—The author presents a series of photographs showing the development of a tornado and a waterspout above the Waddenzee between Terschelling and Vlieland and discusses the atmospheric conditions, especially pressure and winds preceding and during the occurrence of these phenomena and the possible causes of spouts. *Subject Headings:* **1. Tornadoes 2. Waterspouts 3. Netherlands.**—*I.L.D.*

8.1–217 551.576.1:551.515.3

Randall, J., **Funnel cloud at Pickering, Yorks.** *Weather*, 11(1):31, Jan. **1956.** photo. **DWB**—Funnel extended 1500 ft down from cloud base at 3000 ft, 1549–1556 GMT on 7 Aug. 1954. At Kirby Misperton, 3 mi. to S.S.W., it extended to the ground. *Subject Headings:* **1. Funnel clouds 2. Yorkshire, Eng.**—*C.E.P.B.*

8.1–218 551.541:551.515.3

U. S. Weather Bureau, **Evaluation of the Weather Bureau Pressure Jump Reporting Program.** April **1955.** 13 p. 14 figs. **DWB**—The Pressure Jump Program has been in effect for 2 years (1953–54). Statistical and graphical evaluation of results of records from scores of stations with special barographs has shown that one out of four analyzed pressure jump lines had a tornado in its path. More than half of the known tornadoes and waterspouts fell on a PRJMP line and of these almost three-quarters agreed within one hour with time of isochrone of a PRJMP line. Some were analyzed on the basis of only 2 or 3 reports so there is a chance some lines had dissipated. A good pressure jump indicator has been developed by the Instrument Division of the U. S. W. B. It will register an alarm when a pressure jump $\geqq$.005″ Hg/min and at least .02″ total occurs. *Subject Headings:* **1. Pressure jump program evaluation 2. Pressure jump networks 3. Pressure jump indicators 4. Tornado-pressure jump relationships.**—*M.R.*

RADIATION AND TEMPERATURE

RADIATION

See also: **Satellite project** (Wackernagel), 8.1–26; **Daylight illumination recorder** (Blackwell, Powell), 8.1–158; **Cosmic radiation** (Lauter et al.), 8.1–181; **Nocturnal cooling** (Noguchi), 8.1–232; **Radiation climate of Zirbitzkogel** (Dirmhirn), 8.1–310.

8.1–219 551.521.3:546.17:535.33

Mori, Kazuo, **Absorption spectrum of nitrogen dioxide in the vacuum ultraviolet.** *Tokyo. University of Education. Institute for Optical Research, Science of Light*, 3(1):62–69, Aug. **1954.** 2 tables, 2 figs., 21 refs. **DWB**—Photographs of the bands of nitrogen dioxide have been taken in the vacuum ultraviolet region. The λ 1600–1350 bands were arranged in a combination of two progressions, one with a frequency separation of about 600 cm^{-1}, and another of about 400 cm^{-1}. The relatively long ν_1' and ν_2' progressions indicate that both the band distance and the apex angle have changed considerably in the transition to the excited electronic state. Fifteen new diffuse bands have been observed around λ 1800. Some of MULLIKEN's predictions on the electronic structure of NO_2 have been supported in our arguments. *Subject Headings:* **1. Nitrogen dioxide absorption 2. Nitrogen bands.**—*Author's abstract.*

8.1–220 551.521.31

Ditchburn, R. W.; Bradley, J. E. S.; Cannon, C. G. and Munday, G. (all, *Physics Dept., Reading Univ.*). **Absorption cross-sections for Lyman α and neighbouring lines.** (In: Boyd, R. L. F.; Seaton, M. J. and Massey, H. S. W. (*eds.*), **Rocket exploration of the upper atmosphere.** London, Pergamon, **1954.** p. 327–334. 5 figs., table, 15 refs.) **DWB**—The absorption of the Lyman α line (1215.7) Å in O_2, N_2, H_2O (vapor), CH_4 and air has been measured. The absorption coefficient for O_2 is 0.25 cm^{-1} (cross-section 84×10^{-21} cm^2).

ıe value for N_2 is less than 0.001 cm^{-1}, so the calculated value for dry, CO_2 free air is 0.047 m^{-1}. The directly measured value for air is higher, probably owing to the formation of NO the absorption vessel. The variation of the absorption coefficient of O_2 with pressure has en investigated in the range 0.5–20 mm. The coefficient is constant (within experimental ror). The variation with wavelength has been investigated for the range 1200–1230 Å. line whose half-width is 5 Å will be strongly absorbed in the first 10 cm of path, losing about % of its intensity and will then be transmitted with about the above coefficient of absorption. ıe photon-counter measurements obtained with rockets are consistent with a width of less an 1 Å for the line emitted by the sun. *Subject Headings:* **1. Atmospheric absorption bands Solar radiation attenuation.**—*Authors' abstract.*

8.1–221 551.521.4:546.33:535.33

Cronin, Harold E. and Noelcke, Carl L., **Study of the sodium flash.** Geo-Science, Inc., ashington Grove, Maryland, Contract AF 19(604)-640 Final Report, March 1, **1955.** 59 p. figs., numerous tables, 27 refs. Appends. **MAB**—A summary of administrative actions, rsonnel, and correspondence is given. Electrophotometric recordings of the sodium en- ıncement at twilight have been made from Aug. 1953 through Jan., 1955. Recordings of the 00 Å line of oxygen have been made since Sept., 1954, and the tabulated data are given in appendix. After a short discussion of the equipment, plots are given on the monthly mean tios of sodium to background light for individual months and as an annual variation curve. ıe annual variations of the maximum ratios are shown to follow the sun's declination. eights of the sodium layer are given by two methods: 1) the zenith-horizon method and 2) a odified curve-fitting technique. A method is indicated which seems to explain the differ- ces as found by the two methods, and indicates that the height of the sodium layer is about –85 km. These heights show an annual variation, being higher in the winter months than the summer months. A statistical reliability test indicates that the maximum found at 10° lar depression is doubtful during the winter months, but may be real during the summer onths. A short discussion is given of the results of the 6300 Å observations. The data from e sodium-rocket observations are given in an appendix, and a discussion is given of the results otained at the time of firing. If there is a latitude effect, it is too small to be observable the comparison of the data taken at Washington Grove, Md., and Sacramento Peak, N. M., r Jan., 1955. *Subject Headings:* **1. Sodium emission 2. Night airglow spectrum.**—*From thors' abstract.*

8.1–222 551.521.4:551.521.61

Rodionov, S. F.; Pavlova, E. N.; Sholokhova, E. D. and Fishkova, L. M., **Godichnyĭ iod infrakrasnogo izlucheniia nochnogo neba.** [Annual variation of the infrared radiation the night sky.] *Akademiia Nauk SSSR, Doklady,* 98(6):957–960, Oct. 21, **1954.** 4 figs., refs. **DLC**—The author discusses the results of five years of observation of the region of the ectrum between 900–1100 mμ carried out on Mt. Elbrus during the summer and autumn onths. An analysis of the annual variation of infrared radiation of the night sky for the dividual years 1948–1952 indicates that a positive correlation exists between solar activity ıd the intensity of infrared radiation which was highest when the solar activity was maximum. is suggested that this change in the infrared brightness of the night sky may be associated ith variations in the intensity of the ultraviolet radiation of the sun in the region of 1750 Å ıd less. *Subject Headings:* **1. Annual infrared radiation variations 2. Nocturnal radiation Solar activity 4. Mt. Elbrus, U.S.S.R.**—*I.L.D.*

8.1–223 551.521.6:523.87 621.396.8:522

Voigt, H. H., **Das "optische" und das "Radio-Fenster" in der Astronomie.** [The optical ıd radio windows in astronomy.] *Umschau,* Frankfurt a.M., 56(11):323–325, June 1, **1956.** figs. **DLC**—The atmosphere is transparent to electromagnetic waves from 3000 Å to near frared and from <1 cm to 20 m; the latter also pass through clouds. The intensities and ave lengths from sources at 1 to 106 Å are shown; for the sun the maximum is approximately the visible range. Problems of stellar emission are discussed; radio waves are essentially fferent in origin from light rays. *Subject Headings:* **1. Radio astronomy 2. Spectral radiation stribution.**—*C.E.P.B.*

8.1–224 551.521.61:551.586:612.

Knepple, Rudolf, **Die biologischen Wirkungen der infraroten Eigenstrahlung (Gegen strahlung) der Atmosphäre auf den Menschen. Die tonischen Wirkungen des Wetters** [The biological effects of infrared radiation (counter-radiation) of the atmosphere on men The tonic effect of weather.] *Angewandte Meteorologie*, Berlin, 2(9):257–276, July 1956 6 figs., 2 tables, 22 refs. **DLC**—The effects of high temperature and humidity in causing feeling of sultriness are attributed to infrared radiation (IRA) from the atmosphere. The theory of IRA is discussed. Sultriness is related to the accumulation of heat in the body or possibly to direct action of IRA on the nerves. It is so sharply distinguished from othe weather feelings that it has biotropic and even pathological effects (tiredness, sleeplessness headache, blood pressure, bleeding, circulation disturbances); these occur with IRA >0.4 gcal/cm²min. Barotropic effects of different air masses, fronts and weather types are relate to their IRA, which is especially high in S. föhn. A map is given of IRA (calculated b ÅNGSTROM's formula) in Europe for June 20, 1954. *Subject Headings:* **1. Infrared radiatio effects 2. Bioclimatology 3. Sultriness.**—*C.E.P.B.*

8.1–225 551.521.64:537.591.

Bagge, E. and Thielert, R., **Die mittlere Geschwindigkeit der harten Komponente de Ultrastrahlung in Meereshöhe.** [The mean velocity of the hard component of cosmic radia tion at sea level.] *Naturwissenschaften*, 43(16):370, Aug. 15, **1956.** fig., table, 4 refs. **DWI** —The mean velocity of particles measured over a distance of 213 cm was 1.08±0.12 times th velocity of light. *Subject Heading:* **1. Cosmic ray velocity.**—*C.E.P.B.*

8.1–226 551.521.64:551.508.9

Michaelis, E. G. and Powell, B. W., **Cloud chamber observations of negative heavy mesons** *Philosophical Magazine*, 8 Ser., 1(5):441–449, May **1956.** table, 23 refs. **DWB**—Earlie work by the Manchester Jungfraujoch group on slow, negative, heavy cosmic ray particle observed in a magnet cloud chamber has been repeated. An upper limit to the frequency o slow K^--mesons which do not decay in the cloud chamber is now found to be ~1% of th frequency of slow protons. From other published data the probable ratio of the two fre quencies is estimated as about 1:2000. The identity of the observed particles is discussed The previous results giving a high frequency and a long mean lifetime for K^--mesons are no confirmed. One event showing the possible simultaneous production of two slow K^--meson and one example of an upward-moving S^+-particles are described. *Subject Headings:* **1. Cosmi ray research 2. Cloud chamber studies.**—*Authors' abstract.*

8.1–227 551.521.7:621.396.8:523.74

Voigt, H. H., **Radiostrahlung und Sonnenaktivität.** [Radio radiation and solar activity. *Umschau*, Frankfurt a.M., 56(17):525, Sept. 1, **1956.** fig. **DLC**—The correlation betwee solar activity and solar radio radiation is much closer for frequencies above 600 MHz (50 cm than in the meter wave region. On 2800 MHz (10.7 cm), E. TANDBERG-HANSSEN foun a very close relation with monthly sunspot relative numbers Jan. 1950-April 1951. H distinguishes between active and inactive spots. *Subject Headings:* **1. Solar radio radiatio 2. Sunspot effects.**—*C.E.P.B.*

TEMPERATURE

See also: **Killing frosts** (Decker), 8.1–16; **Winters at Brussels** (Vanderplas), 8.1–19; **Low temp. expectancy, N. America** (Court, Parmele), 8.1 34; **Zonal component of geostrophic wind** (Brandejs), 8.1–115; **Upper air averages** (Bannon), 8.1–177; **Thermal balance at soil surface** (Rusin), 8.1–185; **Winds aloft** (Sumi), 8.1–256; **Frost smoke** (Coxon, Hay), 8.1-276; **Temp. of fruit trees** (Primault), 8.1–326, special bibliography on **Solar relations with weather,** p. 95.

8.1–228 551.524.32(410):517.512.

Craddock, J. M., **The harmonic representation of the annual temperature variation i different parts of the British Isles.** *Great Britain. Meteorological Research Committee*

M.R.P., 970, April 30, **1956.** 9 p. 6 figs., 2 tables, 4 refs. Mimeo. **DWB**—In continuation of *M.R.P.*, 915 (*see* 6.11–232, Nov. 1955, *MAB*) the mean annual temperature 1921–50 and the phase and amplitude of the first and second harmonics, calculated from the monthly means, are given for 160 stations in the British Isles and plotted. The phase of the 2nd harmonic is shown by the number of days its maximum falls after that of the first. *Subject Headings:* **1. Annual temperature variation 2. Harmonic analysis 3. British Isles.**—*C.E.P.B.*

8.1–229 551.524.32:697(52)

Daigo, Y. and Suzuki, Y., **Studies on the relation between the using of brazier, kotatsu and the climatic factor.** *Japan. Central Meteorological Observatory, Tokyo, Memoirs of Industrial Meteorology*, 18(2):121–129, March **1955.** 9 figs., 3 tables. In Japanese; English summary p. 129. **DLC**—The authors investigated the relations between the dates of the first and last use of brazier and *kotatsu* and the air temperature of several places in Japan, and then estimated theoretically the dates of the first and last use from the air temperatures in various districts of Japan, where the dates of the first and last use are not observed. The charts of distribution of the dates of the first and last use, theoretically derived from the above method, are shown. *Subject Headings:* **1. Heating dates 2. Annual temperature variations 3. Japan.**—*Authors' abstract.*

8.1–230 551.524.3(437.6)

Petrovič, Štefan, **Štatistické zhodnotenie storočných teplotných pozorování v Oravskom Podzámku.** [Statistical evaluation of one hundred years of temperature observations in Oravský Podzámok.] *Meteorologické Zprávy*, Prague, 5(3):57–61, **1952.** 5 tables, ref. **DLC**—Oravský Podzámok (northwestern Slovakia) has the longest temperature record in Slovakia. Temperature data for the period 1851–1950 are analyzed. The tables presented contain: (1) monthly average temperature for each 10-year period, (2, 4) statistical values of monthly and seasonal average temperatures, such as extreme average, median temperature, lower and upper decile and quartile, etc., (3, 5) frequency of occurrence of specified averages (monthly and seasonal), and (6) absolute monthly maximum and minimum temperatures according to three daily measurements (1851–1900) and according to a maximum-minimum thermometer (1901–1950). *Subject Headings:* **1. Secular temperature variations 2. Long period records 3. Temperature data 4. Orauský Podzámok, Czechoslovakia.**—*G.T.*

8.1–231 551.524.36(46) 551.577.36(46)

Dué Rojo, Antonio (*Dir., Cartuja Obs.*), **Efemérides climatológicas de lluvias y temperaturas extremas en Granada.** [Climatological ephermerides of precipitation and temperature extremes in Granada.] *Granada. Observatorio de Cartuja, Publicaciones, Ser. B*, (73), **1954.** 6 p. graphs. Also issued as: *Urania*, 39(239); 214–219, Oct./Dec. **1954 DWB**—The frequency and intensity of dry and wet, cold and hot spells during the year, based on data for Granada for 50 years (1901–1950), are presented graphically and discussed. The hot spells are days with maximum temperature >35°C, and cold spells with minimum <0°C. Unusually long spells are discussed (including year 1954). The extreme irregularity of the annual curve is most noticeable in the case of the precipitation data, where most of the "singularities" are caused by a few very heavy rains (1 to 3 in 50 years). The temperature curves are also quite erratic, although following a general seasonal pattern. *Subject Headings:* **1. Annual precipitation 2. Annual temperature 3. Cold wave frequencies 4. Hot spell frequencies 5. Singularities 6. Dry and wet spell frequencies 7. Granada, Spain.**—*M.R.*

8.1–232 551.524.31:551.521.32

Noguchi, K., **On the nocturnal cooling.** *Journal of Meteorological Research*, Tokyo, 5(6):481–487, July **1953.** 11 tables. In Japanese; English summary p. 481. **DWB, DLC**—The author investigated nocturnal cooling at Morioka during April, May and June and found that the night should be divided into three periods: 1) from 18 to 21 h the type of soil has a considerable effect upon heat exchange; the rate of cooling is significant, 2) from 21 to 3 h

cooling does not vary with time, and 3) the period from 3 to 5 h is characterized by the decreasing ratio of nocturnal cooling. Physical explanations are offered for these various modes of cooling. *Subject Headings:* **1. Nocturnal cooling 2. Nocturnal radiation 3. Morioka, Japan.**—*From author's abstract.*

8.1–233 551.524.36:551.576.36(439.1)

Péczely, György, **A hőmérséklet és a felhőzet együttes gyakoriságának vizsgálata.** [Investigation of combined frequencies of temperature and cloudiness.] *Időjárás*, Budapest, 59(2):80–85, March/April **1955.** figs., 3 tables, ref. Russian and French summaries p. 80. **DWB**—Combined frequencies of daily mean temperature and cloudiness in Budapest are investigated for each month of the period 1901–1950. Temperature and cloudiness values are classified into 10 types. The annual variations of these types and their relation to prevailing general synoptic situations are analyzed. The types are found to lack uniformity from a synoptic point of view. *Subject Headings:* **1. Temperature frequencies 2. Cloud frequencies 3. Budapest, Hungary.**—*Trans. of author's abstract.*

8.1–234 551.524.37(81) 551.509.62

Serra, Adalberto, **Formação da geada.** [Frost formation.] *A Lavoura*, Rio de Janeiro, 58:8–13, Jan./Feb. **1954.** 3 figs. **DA**—A clear semitechnical discussion of the physical and climatological aspects of frost formation and methods of frost prevention. The three charts show: 1) number of days with freezing temperature, 2) absolute minimum temperatures, and 3) number of days with frost over Brazil. *Subject Headings:* **1. Frost frequencies 2. Frost prevention 3. Brazil.**—*G.T.*

8.1–235 551.524.4:551.558.29:551.515.7

Michalczewski, Jerzy, **Przycznek do znajomosci rozmieszczenia inwersji w obszarach wyzowych.** [Contribution to the knowledge of an inversion in high-pressure areas.] *Przegląd Meteorologiczny i Hydrologiczny*, Warsaw, 6(1/2):79–80, **1953.** fig. **DWB**—A chart based on the results of aerological soundings carried out simultaneously at 19 European stations on Jan. 12, 1953, at the time when a high pressure area moved over the territory, showing the structure contours of the lower surface of the subsidence inversion. The meteorological situation is used for the study of the connection between the subsidence inversion and the disposition of pressure. It confirms the well-known fact that subsidence inversions occur higher in the front part of a surface high pressure area than in its rear part. This shows that in the front part of the high pressure area and on its right and left sides there are favorable conditions for the development of convection clouds. On the other hand, these conditions decrease with the foreward movement of the central and rear parts of the high pressure area because subsidence inversions lie low over the earth's surface. *Subject Headings:* **1. Subsidence inversions 2. Anticyclone structure.**—*A.M.P.*

8.1–236 551.524.4:551.555.3

Untersteiner, N., **Temperaturgradienten bei Föhn.** [Temperature gradients during föhn.] *Wetter und Leben*, Vienna, 6(5/6):113–118, Aug. **1954.** 2 figs., 3 tables, 7 refs. **DLC**—For 25 Austrian stations the author gives the mean maximum temperature gradient and the temperature gradient between station pairs along the Brenner Pass-Innsbruck line on 22 föhn days. It is shown that the varying superadiabatic temperature gradients are a consequence of the geography of the regions over which the föhn streams. *Subject Headings:* **1. Temperature gradient 2. Föhn weather 3. Brenner Pass, Austria 4. Innsbruck, Austria.**—*I.L.D.*

8.1–237 551.524.7:551.515.8

Noguchi, K., **Upper air temperature distribution during winter season in Japan.** *Sendai, Japan. Central Meteorological Observatory, Bulletin of the Meteorological Society for Research of Tohoku District*, 6(1):81–86, Nov. **1951.** 9 figs., 5 refs. In Japanese; English summary p. 253.—The modification of air mass was investigated by using the frequency distribution diagram of temperature in each upper layer at Sapporo, Sendai, Tokyo and Hukuoka. The following results and conclusions were obtained. The modification of air mass is proportional

o its travel distance and the modification of warm air mass is larger than that of cold air mass. In the lower layer, air masses move so slowly that their modification due to the conditions of the earth surface is considerable. The range of temperature frequency distribution is smallest in the lowest layer and increases with height until about 18,000 ft where it becomes constant. In order to determine the air mass in the upper layer at Sendai the frequency distribution diagram of the 700 mb surface was most useful and coincided with synoptic and empirical air mass determination. As the representative characteristics of upper layers, the mode of the frequency distribution of temperature should be used instead of the mean temperature. *Subject Headings:* **1. Upper air temperature distribution 2. Air mass modification 3. Japan.**—*From author's abstract.*

SOIL TEMPERATURE

See also: **Snow, ice, permafrost** (SIPRE), 8.1–55; **Normal soil temp.** (Batta), 8.1–93; **Effect of soil temp. on wheat** (Fuss), 8.1–95; **Thermal balance at soil surface** (Rusin), 8.1–185.

8.1–238 551.525

Funahashi, Y. (*Kyushu Agric. Exper. Station*), **Studies on the shapes of ridge in the wheat or barley field (Preliminary Report).** *Journal of Agricultural Meteorology*, Tokyo, 10(1/2): 19–22, Dec. **1954.** 3 figs., 2 tables, 14 refs. In Japanese; English summary p. 22. Also his: **On the shapes of the ridge in the wheat or barley field, Pt. 2.** *Ibid.*, 10(3/4):131–135, March **1955.** 3 figs., 4 tables. In Japanese; English summary p. 135. **DWB**—Two papers concerning the relation of orientation of rows of wheat or barley to microclimatic conditions and to growth and yield. The E–W oriented ridges are compared with the N–S ridges with respect to insolation at different solar elevations (times of season). After mid-March the radiation received by a N–S ridge was 20% heavier than on the E–W ridges. In winter there is a great difference between four facing slopes, in summer very little. In the second paper the soil temperature on E–W ridges of different shapes at different times during the growing season, especially in winter, seasonal courses of soil temperature at 10 cm depth on each plot, as well as daily maximum and minimum temperature and range at soil surface are analyzed with respect to shape of ridges and growth or yield of crop. *Subject Heading:* **1. Soil temperature variations.**—*M.R.*

8.1–239 551.525:631.4

Pataleev, A. V., **Morozoboĭnye treshchiny v gruntakh.** [Frost fissures in the ground.] *Priroda*, Moscow, 44(12):84–85, Dec. **1955.** 3 figs. **DLC**—The peculiar pattern of frost cracks appearing seasonally in clay soils of Khabarovsk and Amur provinces subjected to considerable swelling in the upper (freezing) portion of the soil in winter, is discussed and illustrated in detail, and numerical data presented in text and diagrams. *Subject Headings:* **1. Frost heaving 2. U.S.S.R.**—*A.M.P.*

8.1–240 551.525.5:551.508.29

Nogami, K., **Observation of the depth of frozen soil by electrical resistance method.** *Journal of Meteorological Research*, Tokyo, 5(1):57–61, March **1953.** 3 figs., table. In Japanese; English summary p. 57. **DLC, DWB**—The depth of frozen soil was observed at Kushiro throughout the winter of 1951–1952 by the electrical resistance method. Twisted copper lines 50 cm in length were stretched horizontally on a frame at a vertical distance of 2.5 cm from each other. Electrical resistance was measured at 21 points from the ground surface to 50 cm depth. According to some direct measurements and the result of NAKAYA's experiments the critical value of freezing is estimated to be 27.3 kilo-ohm at Kushiro. Observed values of the variation of the depth of frozen soil are presented. *Subject Headings:* **1. Frozen soil depths 2. Frozen soil measurements 3. Kushiro, Japan.**—*Author's abstract.*

WATER TEMPERATURE

See: **Relation between wind and heat change in sea** (Sparger), 8.1–68.

PRESSURE AND WIND

PRESSURE

See also: **Pressure pattern flight** (U. S. Air Weather Serv.), 8.1–91; **Weather and man** (Mills), 8.1–102; **Nomogram for computing advective pressure changes** (Brandejs), 8.1–161; **Relative topography as aid in weather map analysis** (Zimmershied), 8.1–168; **Upper air averages** (Bannon), 8.1–177; **Pressure Jump Reporting Program** (U. S. W. B.), 8.1–218; **Wind inclination against isobars** (Watanabe), 8.1–245; **Average height of standard isobaric surfaces** (Heastie), 8.1–255; special bibliography on **Solar relations with weather**, p. 95.

8.1–241 551.541:551.551:551.508.822

Corby, G. A., **A preliminary study of atmospheric waves using radiosonde data.** *Great Britain. Meteorological Research Committee, M.R.P.*, 985, May 24, **1956.** 9 p. 19 figs., 4 refs., 3 eqs. Mimeo. **DWB**—Rates of radiosonde ascents at Leuchars, Stornoway, Aldergrove and Liverpool Nov. 1953–April 1954 were computed and variations exceeding 300 ft/min plotted against height. On 48 occasions (27 at Leuchars), of which 34 were at 14 h and 14 at 2 h, these showed a pattern of vertical currents, mostly <500 ft/min but one >1000 ft/min. The amplitude was generally greatest at 5000–10,000 ft. The associated wind speed and direction (mostly over high ground) at 900 mb are shown. The wave length was 2.6–14.4 mi, average 6–7 mi. The distortion of the temperature structure is discussed. An appendix assesses the errors in evaluating the rate of ascent. *Subject Headings:* **1. Atmospheric waves 2. Radiosonde rate of ascent.**—*C.E.P.B.*

8.1–242 551.547:551.513

Teich, M., **A középtroposzféra magasnyomású területei as Északi-félgömbön.** [High-pressure areas in the middle troposphere over the Northern Hemisphere.] *Időjárás*, Budapest, 58(6):426–437, Nov./Dec. **1954.** 18 figs. Russian and French summaries p. 426. Trans. by Z. Ozorai. **DWB.** German version: **Über die Hochdruckgebiete im mitteltroposphärischen Niveau der nördlichen Nordhemisphäre.** *Acta Agronomica*, Budapest, 5(1/2):231–250, **1955.** Russian and English summaries p. 249–250. **DA**—In 1953 the Institut für Grosswetterforschung was reinstated as part of the Meteorological and Hydrological Service of Eastern Germany. In the intial stages of the Institute's activity, the monthly charts of absolute topography for the 500 mb level issued by the U. S. Weather Bureau were adopted to suit the working methods of the German weather service. From these and from the daily charts of absolute topography (500 mb) a statistical survey of the circumpolar distribution of high pressure areas above 40°N latitude was undertaken for the period 1949–1953. In this paper the distribution of high pressure areas in time and space, the frequency distribution of quasi-stationary anticyclones and the position of cyclone tracks are discussed and illustrated. Owing to the brief period considered no final conclusions can be drawn. *Subject Headings:* **1. Absolute topography 2. Circumpolar baric waves 3. Northern Hemisphere. I. Ozorai, Zoltán** (*trans.*). —*G.T.*

WIND

See: **Zonal component of geostrophic wind** (Brandejs), 8.1–115; **Wind velocity and psychrometric constant** (Kopcewicz), 8.1–148; special bibliography on **Solar relations with weather**, p. 95.

TURBULENCE

See also: **Airplane acceleration, speed and gust velocity** (Coleman, Fetner), 8.1–89; **Decay of non-homogeneous turbulence** (Phillips), 8.1–184; **Atmos. waves study** (Corby), 8.1–241; **Vapor transfer by forced convection** (Cermak, Lin), 8.1–261.

8.1–243 551.551:551.557:522

Keller, Geoffrey, **Astronomical "seeing" and its relation to atmospheric turbulence.** Ohio State Univ. Research Foundation, Contract AF 19(604)-41, Technical Report, No. 1,

Dec. 15, 1952. 36 p. 7 figs., 7 refs., 93 figs. **DWB**—A method is outlined by which it is, in principle, possible to compute the average autocorrelation function of density fluctuations in the earth's atmosphere, assuming that the distribution of light intensity in the "seeing" image of a star is known. The presentation is in two parts, the first being devoted to a qualitative description of the events which occur and a statement of the formulas required for making computations. The second part contains the mathematical theory. *Subject Headings:* **1. Free air turbulence 2. Astronomic meteorology.**—*Author's abstract.*

WIND DISTRIBUTION AND VARIATION

See also: **Airplane acceleration, speed and gust velocity** (Coleman, Fetner), 8.1–89; **Tornado and water-spout** (Postma), 8.1–216; **Post monsoon season,** 8.1–288; **Monsoon rainfall,** 8.1–293; **Point discharge current, potential gradient, wind speed** (Chalmers, Kirkman), 8.1–386.

8.1–244 551.552(521.16):551.577.2

Numata, T., **Air currents in Aizu District.** *Journal of Meteorological Research,* Tokyo, 7(9):553–559, Oct. **1955.** 9 figs., 2 tables, 2 refs., eq. In Japanese; English summary p. 553. **DWB, DLC.** Also issued as: *Sendai, Japan. Central Meteorological Observatory, Bulletin of the Meteorological Society for Research of Tohoku District,* 9(1):31–37, Nov. **1955.** In Japanese; English summary p. 31.—In this paper the author studied chiefly the influence of topography upon a local circulation in Aizu District from the view-point of precipitation forecasting. To begin with, the surface winds in Aizu District are classified according to the direction of general current, and the distribution of precipitation amount caused by the convergence or divergence in the surface layer due to the topography of this area is discussed. *Subject Headings:* **1. Wind distribution 2. Topographic effects 3. Precipitation distribution 4. Aizu District, Japan.**—*Author's abstract.*

8.1–245 551.552:551.542.1

Watanabe, Tsugio, **On the unstationary effect on the inclination of the wind against isobars.** *Journal of Meteorological Research,* Tokyo, 6(9):451–453, **1954.** 2 refs., 5 eqs. In Japanese. **DWB**—The expression for the angle the wind direction makes with the isobars is analyzed into two components, i.e., the angle of inclination for the case of a stationary isobaric field and that for the case of a travelling isobaric field. *Subject Headings:* **1. Wind deviation 2. Ageostrophic winds.**—*H. Arakawa.*

8.1–246 551.553.56:551.509.52(521.11)

*Kon, Y., **On the wind in Tsugaru Channel.** *Journal of Meteorological Research,* Tokyo, 5(6):501–506, July **1953.** 11 figs. In Japanese; English summary p. 501. **DWB**—Statistical data on frequency distribution of wind speed and direction in Tsugaru Strait and on relations between wind speed in the strait and at Aomori are presented graphically for various typical synoptic situations. *Subject Headings:* **1. Wind frequency data 2. Wind velocity 3. Tsugaru Strait, Japan.**—*G.T.*

8.1–247 661.553.8

Fish, George V. (*W. B. A. S., Jackson, Miss.*), **Storm of April 21, 1955.** *Monthly Weather Review,* Wash., D. C., 83(6):137, June **1955. DWB, DLC**—Brief account of a violent windstorm which hit Leavell Woods, 3 mi south of Jackson, Miss., at 5:55 a.m. on April 21, 1955. Although noise was heard due to the wind, no noise of falling trees was heard even a few yards from where large trees were felled. The author suggests that this is in keeping with explanation of Abdullah in *Monthly Weather Review,* April 1955 (*see* 7.3–163, March 1956, *MAB*). *Subject Headings:* **1. Wind storms 2. Leavell Woods, Miss.**—*M.R.*

8.1–248 551.553.8

Storer, H. (*Met. Off., Mildura, Australia*), **A violent windstorm strikes Mildura and district.** *Australian Meteorological Magazine*, Melbourne, No. 8:51–53, March **1955.** 3 figs. **DWB**—A description of the wind storm with accompanying hail and of the damage caused to agriculture is given, and the meteorological situations associated with it are discussed with the aid of hygrograph, thermograph and barograph traces. *Subject Headings:* **1. Wind storms 2. Mildura, Australia.**—*I.L.D.*

SPECIAL WINDS

See also: **Temp. gradient during föhn** (Untersteiner), 8.1–236.

8.1–249 551.555:551.43

U. S. Weather Bureau, **Outline of Weather Bureau wind survey at Oak Ridge, Tennessee.** Wash., D. C., U. S. Weather Bureau, June **1953.** 3 p. 4 figs. **DWB**—A micronetwork of wind stations was used in 1949–1952 to make a local wind survey of the Oak Ridge, Tenn. region. A topographic map shows sites of 17 stations which were placed in representative locations on ridges, slopes, gaps, valley bottoms, etc. Charts showing annual wind roses for each station for each season were prepared and that for summer of 1950 presented. Diurnal variations in local wind patterns were computed for 1, 4, 7, 10, 13, 16, 19 and 22 h EST and samples for fall of 1950 (8 charts) included and discussed. Maximum wind speeds occur at 16 h. A punched card analysis showing relation between surface and 5000 ft wind speed and direction, stability, time of day and season was made and is also discussed. Upper winds were obtained by analysis of pilot balloon observations for 4 nearest upper air stations. (*See also* 5.5–9, May 1954, *MAB.*) *Subject Headings:* **1. Local wind surveys 2. Wind micronetworks 3. Orographic effects on wind 4. Oak Ridge, Tenn. I. Holland, J. Z. II. U. S. Atomic Energy Commission.**—*M.R.*

8.1–250 551.555.8:551.311:631.4

Chepil, W. S. and Woodruff, N. P., **How to reduce dust storms.** *Kansas. Agricultural Experiment Station, Manhattan, Circular*, No. 318, March **1955.** 11 p. 8 figs., table. **DWB**—Dry weather in winter of 1953–54 together with a 70 mph or higher wind and a 12 hr average of 49 mph (Dodge City, Kans.) started dust erosion on an extensive scale. The situation resulted in more (30) dust storms between Feb. 19 and June 30 than at any time since 1940. Most eroded fields were those that lacked vegetation. Even 15 mph winds created clouds of dust where <45% of the soil was nonerodable (due to vegetation or cloddiness). Completely unprotected fields soon lost all soil and ceased to be eroded—inadequately vegetated and nonclodded fields suffered worst. Emergency tillage helps some in trapping soil near where it starts to blow. Conditions were better in north central Kansas—worse to the S. and W. of Dodge City. *Subject Headings:* **1. Dust storms, Kansas (1954) 2. Soil erosion prevention 3. Dodge City, Kans.**—*M.R.*

8.1–251 551.555.8

Svatenko, I. D., **Chernye buri v Priazov'e.** [Black storms in the Azov region.] *Priroda*, Moscow, 44(5):95–96, May **1955.** **DLC**—General information on "black storms" which occurred 15 times (mostly March–April) during the last 65 years in the Azov region with special consideration of meteorological conditions prevailing in the area. The importance of the meteorological and humidity factors in the period preceding the storms is exemplified by an analysis of the last two black storms which raged in the Osipenko region from March 29–April 2, 1949 and from April 2–6, 1953. While both storms were very similar in regard to their development and prevailing winds, the damage incurred was quite different due to contrasting meteorological conditions during the preceding winters and the presence of young forest belts in the second case. This shows the importance of introducing measures to retain moisture in and snow on the fields during the fall and winter. *Subject Headings:* **1. Dust storms 2. Soil conservation 3. Sea of Azov region, U.S.S.R.**—*A.M.P.*

WIND EFFECTS

See also: **Wind-produced homogeneous layer in oceans** (Lumby), 8.1–64; **Wind-driven circulation in ocean** (Veronis, Morgan), 8.1–66; **Relation between wind and heat change in sea** (Sparger), 8.1–68; **Snow damage protection** (Nakano), 8.1–100; **Equivalent head-wind statistics** (Graystone), 8.1–120; **Snow drift** (Hirata), 8.1–294.

8.1–252 551.556.1 551.515.33

Flora, Snowden, D. (*U. S. W. B.*), [**Wind damage.** Series of articles from *Rough Notes*, ndianapolis]. Contents: **Series windstorm losses in 1935.** *Rough notes* Feb. **1936.** 15–16. **Sales campaigns for windstorm insurance.** *Ibid.*, p. 17, 20–21. **Sell windstorm surance in supplemental contract.** *Ibid.*, p. 18–19. **How and why is a tornado?** *Ibid.*, 13–14. **Exceptionally heavy wind damage in 1933.** *Ibid.*, Feb. **1939,** p. 15–17. **Heavy ll of wind damage in lives and dollars.** *Ibid.*, March **1940.** p. 13–15, 59. **DWB**—A series articles giving statistics on wind damage and loss of life in the U. S. from 1916 to the year the report, plus state by state accounts of major tornadoes and wind storms from an inrance point of view. Photographs show sensational aspects of wind damage. *Subject eadings:* **1. Wind insurance 2. Wind damage statistics 3. Tornado statistics 4. United tates.**—*M.R.*

8.1–253 551.5562.

Tanaka, Sadao and Tanizawa, Tsuneo (*Kanto-tosan Agri. Exp. Stat.*), **Studies on the ind in front and back of the shelter-hedges, Pt. 1.** *Journal of Agricultural Meteorology*, okyo, 8(12):61–63, March **1953.** 3 figs., table. In Japanese; English summary p. 63. lso: Tanaka, Sadao; Tanizawa, Tsuneo and Kodera, Shinji, **Contrary wind in front and ack of shelter-hedges (Studies on the wind in front and back of the shelter-hedges, Pt. 2).** *bid.*, 9(12):66–68, March **1954.** 3 figs. In Japanese; English summary p. 68. **MH-BH**—t. 1. The characteristics of natural wind have been investigated in front and back of plain elter hedges, 80 cm high and 15 m long with interstices of 80%, 50%, 20% and 0%. From bservations on horizontal distribution of wind velocity at a height of 50 cm a zone of acleration between the hedges was established. The vertical distribution of the wind velocity etween the various types of hedges is analyzed. Pt. 2. The contrary wind was investigated y use of board fences 90 cm high and 15 m long with interstices ranging from 0% to 80%. he strength of the contrary wind increased as the interstices became smaller. *Subject Headgs:* **1. Shelter belts 2. Wind speed behind shelter belts.**—*I.L.D.*

UPPER AIR WINDS

See also: **Jet stream** (Gazzola), 8.1–193; **Jet stream** (de Pasquale), 8.1–198; **Mean jet stream, India** (Koteswaram, Parthasarathy), 8.1–201; **Subtropical jet stream** (Ramaswamy), 8.1–202; **Atmos. turbulence** (Keller), 8.1–243.

8.1–254 551.557:551.510.53

Greenhow, J. S. and Neufeld, E. L. (both, *Univ. of Manchester, Jodrell Bank Experiment tation*), **Winds in the lower E-region.** (In: Kaiser, T. R. (*ed.*), **Meteors.** London, Pergamon ress, **1955.** p. 92–95. 2 figs., 7 refs.) **DWB**—Winds at altitudes of 80–100 km are inestigated, using radio echoes from drifting meteor trails. As a result of a year's survey of ie winds at these levels, the seasonal variations of the prevailing and semi-diurnal periodic mponents have been resolved. The prevailing wind, which has an amplitude of 15 m/sec, ows towards an easterly quadrant in summer and winter, and towards a westerly quadrant spring and autumn. The periodic wind vector is variable in amplitude and phase; it otates in a clockwise direction, and during most of the year is directed towards the north ear 0600 and 1800 h local time. *Subject Headings:* **1. Upper air wind variations 2. E layer inds.**—*Authors' abstract.*

8.1–255 551.557.2:551.547

Heastie, H., **Average height of the standard isobaric surfaces over the area from the orth Pole to 55°N in July.** *Great Britain. Meteorological Research Committee, M.R.P.*,

981, April 30, 1956. 3 p. 11 figs., 7 refs. Mimeo. **DWB**—In continuation of *M.R.P.*, 918, (*see* 6.11–272, Nov. 1955, *MAB*) circumpolar charts for standard pressure levels are given for July 1949–53, for 700, 500, 300, 200, 150 and 100 mb and intervening thicknesses. They show marked differences from Jan., especially an asymmetric mainly westerly flow over Eurasia, increasing with height, and extending across the pole to give easterly winds over northernmost Canada and Greenland. *Subject Headings:* **1. Relative topography 2. Upper air wind charts.**—*C.E.P.B.*

8.1–256 551.557.3(521.22):551.524.7

Sumi, T., **Winds aloft investigation over Tateno in 1952/53 winter.** *Journal of Meteorological Research*, Tokyo, 7(4):223–230, June **1955.** 5 figs., 7 refs. In Japanese; English summary p. 223. **DWB**—By using the data of winds aloft relay observation between Honjo and Tateno in winter 1952/53, some statistical results are presented. As a general representation the wind profile of W–E and S–N component is given in 10-day and monthly mean. It follows that the wind velocity seems similar in general to that of the previous year. The jet stream of this season was probably situated over Tateno and the neighboring area, then another representation of zonal wind profile is shown for each group with different value of maximum wind velocity. From the time section of 10-day mean the layer of maximum wind velocity is about 1–3 km higher than the tropopause height, and its value decreases with increasing height and with southern component. The variation of tropopause height both tropical and subtropical seems not to coincide in phase with each other, maximum wind velocity being strong with larger pressure difference between them. It may be an evidence of horizontal convergence, suggesting the possibility of confluence mechanism. *Subject Headings:* **1. Wind profiles 2. Upper air wind measurement 3. Tateno, Japan.**—*Author's abstract.*

VERTICAL MOTION

See also: **Frontal zone variations** (Gregor, Křivský), 8.1–199; **Inversion in high-pressure areas** (Michalczewski), 8.1–235.

8.1–257 551.558

Panofsky, H. A.; Miller, Albert; Curtis, Robert; Deland, Raymond and Jones, David L., **Properties of vertical motion, January 1–10, 1953.** Pennsylvania. State Univ. Mineral Industries Experiment Station. Dept. of Meteorology, Contract AF 19(604)-1025, Scientific Report, No. 1, [1955]. 50 p. 3 charts, 13 tables, 14 refs., 15 eqs.—This report first summarizes the various methods available for the computation of vertical motion, and then describes the actual determination of vertical motion for the period of Jan. 1–10, 1953. In comparing the results of the different computations, some considerable nonadiabatic heating is found for air moving southward; also a method is suggested for determining the effect of friction on vertical motion. Finally, the probability of rain, overcast and clear is evaluated as function of dew point depression and vertical motion. *Subject Headings:* **1. Vertical motion 2. Frictional effects.**—*Authors' abstract.*

8.1–258 551.558:551.511:551.509.25

Sanders, Frederick, **Relationships between weather and indicators of vertical motion.** Massachusetts Institute of Technology, Dept. of Meteorology, Contract AF 19(604)-1305, Scientific Report, No. 1, Sept. **1955.** 19 p. fig., 7 tables, 8 refs., 3 eqs.—The probability of occurrence of cloudiness or precipitation at Boston is related to concurrent values of quantities which can be measured from charts of the atmospheric circulation pattern near the ground and in the middle troposphere. These quantities are considered to be indicative of the large scale vertical motion in the troposphere. Two such quantities, the thickness advection and a quantity derived by SUTCLIFFE, are shown to be related to the probability of occurrence of cloud and precipitation in the expected sense. It is found that values of the SUTCLIFFE expression are highly correlated with vertical velocities computed from the thermotropic numerical prediction model, thus offering the forecaster an opportunity of assessing vertical motion from appropriate prognostic charts regardless of the method of their preparation.

Use of surface and upper level charts at slightly different times renders the results slightly ess reliable. Preliminary testing indicates that prognostic charts which predict reasonably well the large scale features of the horizontal circulation pattern do not necessarily predict the pattern of vertical motion with equal success. Observed thickness changes at Boston indicate that substantial warming occurs in the winter season which is not predicted by horizontal advection and adiabatic temperature changes associated with vertical motions indicated by the SUTCLIFFE expression. It is suggested that nonadiabatic heating is of considerable importance even in winter in some land areas. *Subject Headings:* **1. Prognostic charts 2. Vertical motion forecasting.**—*Author's abstract.*

AQUEOUS VAPOR, HYDROMETEORS AND HYDROMETEOROLOGY

HUMIDITY

See also: **Forest influence on air humidity** (Mrose), 8.1–99; **Moisture and heat transmission effects** (Cammerer), 8.1–105; **Soil-air humidity recorder** (Hofmann), 8.1–147; **Finnish radiosonde hygrometer** (Raab), 8.1–153; **Humidity profile** (Thornthwaite, Beenhouwer), 8.1–157; **Stability and moisture analysis** (Bradbury), 8.1–190; **Vapor transfer by forced convection** (Cermak, Lin), 8.1–261.

8.1–259 551.571.3:551.509.54(52)

*Kinoshita, M., **Utilization of dew-point temperature to weather forecasting.** *Journal of Meteorological Research*, Tokyo, 6(1/3):47–51, March **1954.** 3 figs., 4 tables, 5 refs. Also in: *Oceanography and Meteorology, Nagasaki*, 6(2):141–145, Dec. **1954.** 3 figs., 4 tables, 5 refs. Both in Japanese with English summaries. **DWB**—It is shown statistically that the dew point temperature along the meridian of 130°E (through Nagasaki) can be used as a forecast tool for clear or rainy weather. For instance at Nagasaki the following was found:

	Clear	Rainy
Jan.	30–35°F	40–45
Apr.	40–45	60–65
July	65–70	70–75
Oct.	50–55	65–70

At Ishigaki Jima the same distinction is shown, though temperatures are much higher:

	Clear	Rainy
Jan.	50–55°F	60–65
July	70–75	75–80

Subject Headings: **1. Rainfall forecasting 2. Dew point temperature 3. Nagasaki, Japan.** —*M.R.*

8.1–260 551.571.7(410)

Helliwell, N. C.; Mackenzie, J. K. and Kerley, M. J., **Further observations of humidity up to 50,000 feet made from an aircraft of the Meteorological Research Flight in 1955.** *Great Britain. Meteorological Research Committee, M.R.P.*, 976, April 30, **1956.** 7 p. 5 figs., 3 tables, 6 refs. Mimeo. **DWB**—In continuation of M.R.P., 877, 1954 (*see* 6.6–258, June 1955, *MAB*), observations with a pressurized frost point hygrometer and flat plate thermometer around and over the British Isles are tabulated for 45 occasions, 5000–50,000 ft. Means and standard deviations are given for 1954 and 1955. The mean frost point decreases about 3½°F/1000 ft from 20,000–40,000 ft and then more slowly to approach −117°F at 50,000 ft. With high tropopause frost point is generally lower than with low tropopause. *Subject Headings:* **1. Upper air humidity 2. British Isles.**—*C.E.P.B.*

EVAPORATION AND EVAPOTRANSPIRATION

8.1–261 551.573:551.551:551.57

*†Cermak, J. E. and Lin, P. N., **Vapor transfer by forced convection from a smooth, plan boundary.** Colorado Agricultural and Mechanical College. Dept. of Civil Engineering Contract N9onr-82401 (NR063-071/1-19-49), Report, No. 9, Jan. **1955.** 83+43 p. 37 figs. 30 tables, 31 refs., 31 eqs. **DWB**—Important literature on experimental and theoretica studies of evaporation from a plane surface is reviewed in Ch. 2 (p. 7–16); theory for a fully developed boundary layer giving total rate of evaporation and temperature profile in Ch. 3 description of equipment and observation techniques (wind tunnels, evaporation pans, plat measurements, relative humidity, evaporation and pressure measurements) Ch. 4; and a analysis of data (von Kármán constant, shear velocity and evaporation in turbulent transi tional boundary layer) in Ch. 5. The following conclusions are drawn: 1) the evaporatio parameter **N** is uniquely determined by R* (Reynold number), regardless of type of boundary layer regime; 2) SUTTON's theory modified by PASQUILL gives a sound basis for mass and hea transfer studies by forced convection; 3) when R^* is $<10^3$ the effect of lateral diffusion is no appreciable, etc. *Subject Headings:* **1. Vapor transfer from boundary layers 2. Evaporatio from plane surfaces 3. Turbulent exchange.**—*M.R.*

8.1–262 551.573(437.1/3

Jílek, Josef, **Plošné rozdělení ročního výparu vody v Čechách, na Moravě a ve Slezsku** [Areal distribution of annual evaporation in Bohemia, Moravia and Silesia.] *Meteorologické Zprávy*, Prague, 5(3):77–78, **1952.** chart. **DLC**—The chart presented and briefly explained shows isolines of average annual total evaporation for the western part of Czechoslovakia with values ranging from 370 to 530 mm. *Subject Headings:* **1. Areal evaporation distributio 2. Czechoslovakia.**—*G.T.*

8.1–263 551.573(437.6):551.508.72

Kacvinský, Martin, **Výpar vody v Hurbanove** (1901 1950, 1941–1950). [Evaporatio in Hurbanovo, 1901–1950, and 1941–1950.] *Meteorologické Zprávy*, Prague, 5(1):7–11, 1952 5 tables, 12 refs., eqs. German summary p. 7. **DLC**—Evaporation measurements in Hur banovo have been made since 1890 by means of scale-type Wild evaporimeters with 250 cm evaporation pans. Data on evaporation at Hurbanovo are tabulated for a shelter (1901–1950 and for a free surface (1941–1950). The values presented include monthly and daily mean and extremes, number of days without evaporation, monthly values of maximum possibl evaporation, and actual evaporation from the ground covered with vegetation. Added are a table of monthly means of various climatic elements (temperature, precipitation, relative humidity, sunshine, cloudiness) and one of climatic values according to THORNTHWAITE' classification. *Subject Headings:* **1. Evaporation measurement 2. Wild evaporimete 3. Thornthwaite's classification 4. Hurbanovo, Czechoslovakia.**—*G.T.*

8.1–264 551.573;551.50

Mather, John R., **Investigation of Thornthwaite's evapotranspiration formula and pro cedure.** *Johns Hopkins Univ. Laboratory of Climatology, Publications in Climatology*, 7(3) 379–384, **1954.** 2 tables, 10 refs. **DWB** No satisfactory simplification or modification of the original equation, proposed by THORNTHWAITE, for the computation of potential evapo transpiration was found. Inconsistent discrepancies between computation and observations in various parts of the world were found. The author is reluctant to introduce a humidity term. A rational energy balance approach is very promising. In particular, the ratio betwee heat used for evaporation and the total available heat seems to depend linearly on soil moisture *Subject Headings:* **1. Potential evapotranspiration 2. Thornthwaite's method 3. Energy balance.**—*A.A.*

8.1–265 551.573:551.577.3:581.1

Morello, Jorge (*Univ. del Litoral*), **Cuanta agua transpiran las plantas?** [How great is plant transpiration?] *Ciencia e Investigacion*, Buenos Aires, 9(2):51-60, Feb. **1953.** 4 figs. 24 refs. **DLC**—Direct and indirect methods of plant transpiration measurement are explained

Daily and annual variations of transpiration and their connections with atmospheric conditions are discussed and the importance of the effect of rainfall distribution on transpiration values is stressed. Typical transpiration amounts are given in graphic form for various types of plant cover such as forest, grassland and cultivated plants in various parts of the earth. Transpiration as a factor in climate classification is also discussed. *Subject Headings:* **1. Plant transpiration measurement 2. Transpiration 3. Rainfall effects on transpiration values.** —*G.T.*

8.1–266 551.573:551.48(438)

*Schmuck, Adam, **Parowanie z wolnej powierzchni wodnej w Polsce.** [Evaporation from free water surface in Poland.] *Wrocławskie Towarzystwo Naukowe, Sprawozdania*, 8(1), **1955.** 19 p. 10 figs., tables, 11 refs. **DWB, DLC**—Evaporation from free water surface is a continuous process of great importance for water economy, navigation, hydroelectric plants, water reservoirs, canals, sluices, fish ponds, etc. of a country. The author presents the results of his study of such evaporation in Poland for 1948–1952. The calculation is based on the empirical formula of potential evaporation $Er = 30dr$, where Er is the annual amount of evaporation in mm, and dr is the annual amount of mean monthly deficiency of humidity. This coefficient was accepted as a mean on the basis of 102 comparative estimations of evaporation made simultaneously with the aid of Wilde evaporimeters in an open spot exposed to the action of sun and winds on the bank of the Oder River and in a quiet place near the observatory. It was calculated for 0 m height. The results of calculations of moisture (humidity) deficiency made on the basis of P.I.H.M. data for 41 stations are presented on maps showing the distribution of mean annual, cold and warm season isothymes (lines of equal evaporation) and a comparison of their distribution in a dry and a rainy year, half year and month (1951 was dry; 1952, rainy). The mean monthly, semiannual and annual amounts of evaporation (with their maximum and minimum values in any day of the whole period and their amplitude for 41 stations) are presented in a table and discussed. They do not reveal any synchronous tendencies of the whole territory of Poland; on the contrary, some regions show an increase of evaporation at the time when others show a decrease. *Subject Headings:* **1. Evaporation from water surfaces 2. Water conservation 3. Evaporation data 4. Poland.**—*A.M.P.*

CONDENSATION

See also: **Cloud-droplet ingestion in engin inlets** (Brun), 8.1–87; **Droplet impingement on airfoil** (Brun, Vogt), 8.1–88; **Spring frost prevention** (Bouchet), 8.1–173; **Drop growth in convective water clouds** (Krustanov, Samardzhiev), 8.1–282; **Ionization of radioactive particles** (Greenfield), 8.1–383.

8.1–267 551.574.1:551.576.11

Durbin, W. G., **Droplet sampling in cumulus clouds.** *Great Britain. Meteorological Research Committee, M.R.P., 991,* June 14, **1956.** 30 p. 10 figs., 13 tables, 10 refs. Note by B. C. V. Oddie, **The relationship between drop-size distribution and visibility.** 2 p. table. Mimeo. **DWB**—Samples of droplets obtained by aircraft impactor were analyzed photographically. Results are tabulated in full. Clouds 750–2500 and 3850–7000 ft thick are discussed separately. The droplet sizes were arranged in 10 categories (5.28–119μ). There was great variation in range of drop diameters in different flights, but mode was 7½–9μ with in some cases a secondary maximum at 15μ. The water content of the different categories is examined in detail. It tends to increase with height and to be larger in thicker clouds, averaging 0.5 gm/m^3 below 2500 ft thickness, 1.0 above, but up to 5 gm/m^3. Content is generally below adiabatic values. Mean diameter increased from 7–13μ at base to 23–27μ at top of cloud, but no systematic variation of number of droplets (100–300/cm^3) was found. Oddie discusses discrepancy between estimated visibility and that calculated from droplet size distribution. *Subject Headings:* **1. Drop size data 2. Cumulus cloud structure. I. Oddie, B. C. V.**—*C.E.P.B.*

8.1–268 551.574.1

†Gucker, Frank T., Jr., **The coagulation of aerosols.** Indiana. Univ. Dept. of Chemistry, Contract AF 19(122)-375, Final Report, June 27, **1955.** 35 p. 20 figs., 6 tables, 81 refs., 48 eqs.—This report deals with experimental and theoretical studies of the light-scattering properties of aerosols and their application in determining particle size and thus studying the process of coagulation in aerosols. It is divided into five sections, as follows: 1) introduction, 2) a summary of work previously done on the coagulation of aerosols, 3) a new forward-scattering aerosol particle counter, 4) an apparatus for measuring light scattering from single aerosol particles and 5) calculations from the Mie theory. *Subject Heading:* **1. Aerosol coagulation.**—*Author's abstract.*

8.1–269 551.574.1:551.576.1 551.509.67

Ludlam, F. H., **The structure of rainclouds.** *Weather*, 11(6):187–196, June **1956.** 2 plates, 2 tables. Reprinted from **The Times Science Review. DWB**—The causes of formation of different cloud types are described. The initiation and growth of cloud droplets, formation of ice crystals, and aggregation processes are next considered, then the conditions for formation of rain and time needed for it to develop, which in some cases exceeds the life of cloud particles. Only multilayer clouds always precipitate. The artificial production of precipitation is described but the effectiveness is still uncertain. *Subject Headings:* **1. Cloud physics 2. Artificial precipitation.**—*C.E.P.B.*

8.1–270 551.574.1

Nolan, P. J. and Kuffel, E. (*Univ. College, Dublin*), **Coagulation and diffusion of enclosed nuclei.** *Geofisica Pura e Applicata*, Milan, 31:97–106, May/Aug. **1955.** 2 figs., 5 tables, 12 refs., 2 eqs. English and German summaries p. 97. **DWB, DLC**—Decay experiments were carried out with ultra small nuclei, the sedimentation loss of which is negligible. It was found that the coefficient of the linear diffusion term in the decay equation varies as the square root of the diffusion coefficient. An interpretation of this relation, which takes convection into account, is suggested. Previous decay experiments are examined in the light of the new relation. *Subject Headings:* **1. Small nuclei coagulation 2. Nuclei decay 3. Nuclei diffusion coefficients.**—*Authors' abstract.*

8.1–271 551.574.1:544.8:546.13

Pidgeon, Frances D. (*Cloud Physics Project, Chic. Univ.*), **Controlling factors in identification of microscopic chloride particles with sensitized gelatin films.** *Analytical Chemistry*, Wash., D. C., 26(11):1832–1835, Nov. **1954.** 7 figs., ref. **DLC**—An extensive investigation of the use and the limitations of the sensitized gelatin film for the identification of microscopic chloride particles included study of the effects due to variations in the preparation and thickness of the sentitized gelatin film, methods of sample collection, temperature, and examination techniques. The relation of particle size to halo size and growth and fading rates for sodium chloride particles are presented. *Subject Headings:* **1. Chloride particle identification 2. Saline nuclei.**—*Author's abstract.*

8.1–272 551.574.41:581.14

Duvdevani, Shamuel, **Les effets de la rosée sur la croissance des plantes.** [Effects of dew on plant growth.] *La Météorologie*, Paris, Ser. 4, No. 36:468-469, Oct./Dec. **1954. DWB**—The article is a translation of a memorandum, communicated by UNESCO at a press conference in Jan. 1954, concerning the important discovery made by the author which sheds a new light on the moisture balance of plants. The author discovered during his experiments that during periods of abundant dew one could observe drops of dew on the roots of some plants (blue grass, bind grass, mulberry). After further experiments with different species of plants it was decided that the possibilities offered to agriculture, especially in arid regions, are so important that the study of dew will become the major purpose in desert areas. A simple easily readable dew meter for the determination of dew at any place has been also devised by the author and accepted by WMO at its Sept. 1953 session as an official standard instrument. *Subject Headings:* **1. Dew 2. Dew effects on plant growth 3. Dew meters 4. Plant ecology.**—*A.M.P.*

8.1–273 551.574.42:77

Kuroiwa, Daisuke, **Growth of air hoar in supercooled fog.** *Low Temperature Science, Ser. A, Physical Sciences*, Sapporo, Japan, 13:105–109, **1954.** 3 photos, 3 refs. In Japanese. **DWB**—Ten beautiful photographs show tiny feathers of hoar frost building up on fine threads or wires and assuming fantastic lacy forms. *Subject Headings:* **1. Hoar frost growth 2. Frost photographs.**—*M.R.*

8.1–274 551.574.42

Stempnevskiĭ, V. M. (*Moscow Inst. of Transport Engrs.*), **Spiral'nye kristally l'da.** [Spiral crystals of ice.] *Priroda*, Moscow, 44(7):113–114, July **1955.** fig. Discussion by P. A. Shumskiĭ, p. 114. **DLC**—A very unusual example of ice formation in spirals was observed in the vicinity (40 km) of Moscow on Nov. 1953 in 2 ponds. A block of ice was cut out along the periphery of one pond and placed upright on one side near the shore. The lower part of the block was covered with concentric ice riffles 8–10 cm thick. Another block of ice taken from the second pond showed the same peculiarity. No explanations are given by the author. A tentative explanation of the phenomenon is given by P. A. Shumskiĭ. He thinks that the concentric riffles were caused by the supercooling of a considerable water layer. As is known from laboratory experiments, ice crystals with main axes oriented horizontally or obliquely grow out deep into the supercooled layer in the form of blades. In the following stages of ice formation these blades or riffles can remain only when supercooling ceases before the freezing-out of the whole layer. The riffles protruding downwards must be monocrystals with an almost horizontal orientation of the main axes. *Subject Headings:* **1. Spiral ice crystals 2. Ice crystal formation 3. Moscow, U.S.S.R. I. Shumskiĭ, P. A.**—*A.M.P.*

8.1–275 629.13:551.574.7

Bowden, Dean T., **Effect of pneumatic de-icers and ice formations on aerodynamic characteristics of an airfoil.** *U. S. National Advisory Committee for Aeronautics, Technical Note*, 3564, Feb. **1956.** 59 p. 30 figs. (incl. photos), 13 refs. **DLC, DWB**—Measurements of drag, lift, and pitching moment of an NACA 0011 airfoil were made in icing conditions using pneumatic de-icers having either spanwise or chordwise inflatable tubes. Lift and drag penalties due to de-icer inflation and to ice remaining after de-icer inflation are presented. Inflation of the spanwise-tube de-icer caused a much greater increase in drag than inflation of the chordwise-tube de-icer. The two de-icers were equally effective in removing ice. Lift and drag penalties resulting from ice formed with the de-icer inoperative are also presented, as well as spoiler data for analyzing drag increases due to ice formations. *Subject Headings:* **1. De-icing of aircraft 2. Ice formation.**—*NACA abstract.*

FOG

See also: **Humidity in fog** (Fukutomi, Sugawa), **8.1–145.**

8.1–276 551.575.1:551.524.37

Coxon, A. and Hay, R. F. M., **Frost smoke.** *Marine Observer*, 26(173):163–165, July **1956.** photo, 2 refs. **DLC**—Coxon gives a photo of Arctic sea smoke off Portland, Eng., Feb. 2, 1956. Hay discusses conditions for its formation (air temperature 16°F below sea temperature). It has not previously been recorded in the English Channel, but the ENE winds of Feb. 1–2 were exceptionally cold. *Subject Heading:* **1. Frost smoke.**—*C.E.P.B.*

8.1–277 551.575.1(423)

Saunders, W. E., **Variation of visibility in fog at Exeter Airport, and the time of fog dispersal.** *Great Britain. Meteorological Research Committee, M.R.P.*, 971, April 9, **1956.** 7 p. 2 figs., 7 tables, ref. Mimeo. **DWB**—The airport is in a shallow basin 3 mi east of Exeter. Fog is water fog forming at relative humidity of 95%. Transition from visibility 1100 yds to 550 yds is generally 0–1 hrs, to 220 yds, 0–2 hrs. Dense fog may still be expected, though less probable, when fog point is below 40°F. Decrease of visibility is also related to preceding haze, wind direction and wetness of ground. Fog is generally dispersed by cloud cover at

night. Morning clearance is 2–3 hrs after sunrise in clear weather, 3–6 hrs in cloudy weather. *Subject Headings:* **1. Fog intensity 2. Exeter, Eng.**—*C.E.P.B.*

CLOUDS

See also: **Ceiling/visibility met. equipment** (Sperry Gyroscope Co.), 8.1-90; **Funnel cloud** (Randall), 8.1–217; **Temp. and cloudiness frequencies** (Péczely), 8.1–233; **Droplet sampling** (Durbin), 8.1–267; **Raincloud structure** (Ludlam), 8.1–269; **Visibility studies** (U. S. W. B.), 8.1–364; **Electrification of particles in clouds** (Arabadzhi), 8.1–378.

8.1–278 551.576.1

Khrgian, A. Kh., **Nekotorye dannye o mikrostrukture oblakov.** [Data on the microstructure of clouds.] *Leningrad. Tsentral'naia Aerologicheskaia Observatoriia, Trudy*, No. 7:50–55, 1952. table, 3 refs., eqs. **DLC**—The optical method for determining (q), the total mass of liquid drops in clouds, developed in the Central Aerological Observatory is described and the formula for calculating q is presented. With the aid of this method, the author determines the water droplet content and droplet radii of the lower cloud strata (including the lower parts of frontal clouds); convective clouds were not studied. The data on distance of visibility in clouds, their water content and its variability with height and evidence of turbulence in clouds are discussed. *Subject Headings:* **1. Water content of clouds 2. Visibility in clouds.**—*I.L.D.*

8.1–279 551.576.1:551.578.11

Khrgian, A. Kh. and Mazin, I. P., **O raspredelenii kapel' po razmeram v oblakakh.** [The drop size distribution in clouds.] *Leningrad. Tsentral'naia Aerologicheskaia Observatoriia, Trudy*, No. 7:56–61, 1952. 3 figs., 8 refs. **DLC**—Various formulas for determining the spectrums of droplet radii or droplet volume and the relationship between droplet radius and droplet fall are presented. It is found that droplets with radii less than 20μ do not grow as a result of gravitational coagulation. In such clouds only larger cloud droplets can increase in size, for example $>r=28\mu$. The increase in the radius of large droplets falling through clouds is proportional to the water content of the clouds and to the length of the paths of fall. *Subject Headings:* **1. Drop size distribution in clouds 2. Rain formation.**—*I.L.D.*

8.1–280 551.576.11

Day, G. J., **Further observations of large cumuliform clouds by the Meteorological Research Flight.** *Great Britain. Meteorological Research Committee, M.R.P.*, 980, April 30, 1956. 36 p. 3 figs., 11 tables, 19 refs. Mimeo. **DWB**—A number of observations in flights through upper parts of cumulus clouds are tabulated (maximum and mean water content, icing, height, temperature, excess temperature in cloud, and turbulence). Cells were about 2½ mi across, with cloud asymmetric around them. Life cycle of a cell was 20–25 min. The structure accords with the bubble theory; interaction with environment is weak, with little entrainment. Droplet size was 40μ at first, increasing to 120μ; the suggested rain-producing mechanism is Bergeron below 10°F, coalescence above 20°F, and a combination in 10–20°F. Vertical motion, turbulence, water content, temperature and electrical activity are also dealt with in this exhaustive discussion. *Subject Heading:* **1. Cumulus cloud structure.**—*C.E.P.B.*

8.1–281 551.576.11

James, D. G., **Nocturnal dissipation of stratocumulus cloud.** *Meteorological Magazine*, London, 85(1009):202–208, July 1956. fig., 4 tables, ref. **DWB**—Same as *Great Britain. Meteorological Research Committee, M.R.P.*, 913, April 12, 1955 (*see* 6.11–291, Nov. 1955, *MAB*). *Subject Heading:* **1. Stratocumulus dissipation.**—*C.E.P.B.*

8.1–282 551.576.11:551.574.1

Krustanov, L. and Samardzhiev, D. T., **Vurkhu ugolemiavaneto na oblachni kapki vuv vodni konvektivni oblasti.** [The increase of drop size in convective water clouds.] *Bulgarska*

Akademiia na Naukite, Sofia, Izvestiia, Otdelenie za Fiziko-Matematicheski i Tekhnicheski Nauki, Seriia Fizicheska, 3:77–88, Jan./Dec. **1952.** 2 figs., 8 refs., 18 eqs. Russian and German summaries p. 89–90. **DLC**—A highly theoretical paper in which the author analyzes the enlargement of drops in convective water clouds by gravitational coagulation, noting that Stokes' formula for the falling speed of small drops does not affect drops with a radius over 50–60μ. KRUSTANOV's formula has been used for drops with $R > 500\mu$. It has been determined that the time of development of the drop to a given size and the trajectory of drops in clouds in their rising and falling movements are independent of the initial size of the growing drops, the sizes of cloud drops and the speed of the anabatic air flow, which is taken as constant. Extreme dimensions of growing drops leaving the cloud independent of the cloud thickness have also been determined. The results of the investigation show that conditions for obtaining precipitation from convective water clouds are determined mainly by the relationship between the speed of rising air currents, the cloud thickness and the initial size of growing drops in case the cloud drop sizes remain unchanged. *Subject Headings:* **1. Drop accretion 2. Drop velocities 3. Drop size distribution.**—*A.M.P.*

8.1–283 551.576.3:551.515.82

Sawyer, J. S. and Dinsdale, F. E., **Cloud in relation to active warm fronts near Bircham Newton, 1942–46.** *Great Britain. Meteorological Office, Professional Notes*, No. 115, **1955.** 10 p. 14 tables, ref. Also issued as *Great Britain. Meteorological Committee, M.R.P.*, No. 799, April **1953.** (*See* 5.3–255, March 1952, *MAB.*) **DWB, DLC**—The cloud structures of 76 active warm fronts are examined in relation to a number of parameters available to the operational forecaster. The only significant correlation (about 0.4) is between the extent of frontal cloud and the component of wind relative to the surface front taken normal to the front at its upper boundary. An examination of the vertical distribution of cloud in relation to the frontal zone reveals a tendency for the slope of the edge of the cloud to be steeper than the slope of the front. *Subject Headings:* **1. Cloud structure 2. Warm fronts 3. Bircham Newton, Eng.**—*Authors' abstract.*

PRECIPITATION

See also: **Precip., Missouri** (Decker), 8.1–17; **Precip. variations, SW Africa** (Gellert), 8.1–18; **Winters at Brussels** (Vandenplas), 8.1–19; **Precip. at sea** (Skaar), 8.1–20; **Average total precip. computation** (Drobilovâ), 8.1–119; **Rainfall variation with height** (Harper), 121; **Precip. in Norway** (Norway Met. Inst.), 8.1–127; **Sutcliffe's development theory** (Venkataraman), 8.1–188; **Precip. and temp. extremes, Granada** (Dué Rojo), 8.1–231; **Air currents** (Numata), 8.1–244; **Plant transpiration** (Morello), 8.1–265; **Lightning and rainfall** (Balasubramania), 8.1–384; special bibliography on **Solar relations with weather**, p. 95.

8.1–284 551.577.35(439.1)

Kakas, József and Kéri, Menyhért, **Az 1955. év nyarának csapadékossága a normálok tükrében.** [Rainfall of summer 1955 as compared to normal values.] *Időjárás*, Budapest, (59(6): 359–369, Nov./Dec. **1955.** 17 figs., 3 tables. Russian and English summaries p. 359. **DWB, DLC**—The summer of 1955 was an unusually rainy one in Hungary. In average rainfall for the three summer months it ranks third (behind 1940 and 1915) in the last 55 yrs. Average rainfall for Hungary in July and Aug. 1955, the rainfall distribution on individual days, the number of rainy days, temperature distribution, etc., are shown in charts. The various values are found to be very unevenly distributed over Hungary in space and time. *Subject Headings:* **1. Summer precipitation 2. Hungary.**—*G.T.*

8.1–285 551.577.36(521.52)

Masatsuka, A. and Kusama, S., **On a simple frequency analysis of rainfall data at Matsumoto, Nagano Prefecture.** *Journal of Meteorological Research*, Tokyo, 7(5):277–282, July **1955.** 4 figs., 2 tables, 6 refs., eqs. In Japanese; English summary p. 277. **DWB**—Recently C. K. STIDD (1953) pointed out that the frequency of cube roots of precipitation amounts is often distributed normally. For the test of the applicability to our region of this

cube-root-normal precipitation transformation, the sets of data for some stations in Japan have been examined. In consequence of this test the above rules seem, in general, to be well suited for the single station records for various durations in our country. Then using this normalizing technique and the occurrence probability of a value equal to or greater than T_p-year (return period) precipitation, the amounts for various durations, which can be expected to occur on an average once in any long period of time (T_p-years), are estimated with considerable assurance. And it has been found that the curve of the T_p-year amounts $[R(T_p)]$ for durations ranging from four hours to two days is generally shown to be closely approximated by the expression $R(T_p) = \text{const.} \times D^{0.44}$, where the amount is expressed in mm, and the duration in min. *Subject Headings:* **1. Rainfall frequency distribution 2. Matsomoto, Japan.**—*Authors' abstract.*

8.1–286 551.577.36(438)

*Siadek, Bronisław, **Częstotliwość opadów atmosferycznych na Hali Gąsienicowej.** [Frequency of atmospheric precipitation in the Gąsienicowa Valley.] *Przegląd Meteorologiczny i Hydrologiczny*, Warsaw, 7(1/2):37–43, **1954.** 3 figs., 5 tables, eqs. English summary p. 43. **DWB, DLC**—The results of the study of precipitation frequency in the largest valley of the northern slopes of the Tatra Mountains, based on observational data at the local meteorological station for 1927–1951, are presented in tables showing the number of days with precipitation during every month of the period, and its monthly, seasonal and annual mean. The great frequency of precipitation in the area is explained by the altitude of the station (1520 m), a variety of barometric situations and valley winds causing orographic precipitation. Further, the author classifies the days with precipitation into categories (under 0.1 m/m; 0.1–1.00 mm; 1.0–10.0 mm; and 10 mm and over) and discusses the frequency of their occurrence according to months and seasons. *Subject Headings:* **1. Precipitation frequencies 2. Gąsienicowa Valley, Poland 3. Tatra Mountains, Poland.**—*A.M.P.*

8.1–287 551.577.36:551.515.2(52)

Suzuki, E. and Tomatsu, K., **A statistical study of the daily amount of precipitation, Pt. 1.** *Journal of Meteorological Research*, Tokyo, 5(8):655–668, Sept. **1953.** 9 figs., table. In Japanese; English summary p. 655. **DWB**—Frequency distribution of daily precipitation amount has already been studied by many authors. In this paper we investigated the distribution of precipitation amount due to all of various factors and that which resulted from typhoon only for the typhoon season, July to Oct. and for those two cases the Γ- and Poisson distributions were tested. Also the meteorological and statistical character of the geographical distribution of parameter for Γ-distribution was considered. We conclude that the two distributions of precipitation amount seem to be the Γ one, and the distribution of parameter for Γ-distribution has a meteorological character. (For Pt. 4, *see* 7.9–202, Sept. 1956, *MAB.*) *Subject Headings:* **1. Precipitation frequency distribution 2. Typhoon precipitation distribution 3. Gamma-distributions 4. Japan.**—*Authors' abstract.*

8.1–288 551.577.35:551.553.21

Weather, post monsoon season, October–December 1954. *Indian Journal of Meteorology and Geophysics*, Delhi, 6(2):189–192, April **1955.** fig. **DWB, DLC**—The principal characteristics of the post monsoon are rapid withdrawal of the southwest monsoon from India, formation and movement of three depressions and one brief cyclonic storm in the Bay of Bengal and deficient northeast monsoon rains over the Peninsula. A detailed description of the post monsoon weather for each month from Oct. to Dec. is given and a map showing rainfall for the given period as per cent departures from normal is presented. *Subject Headings:* **1. Post-monsoon season 2. Rainfall data 3. Atmospheric disturbances 4. India.**—*I.L.D.*

8.1–289 551.577.37:551.501.4

Hershfield, David Michael; Weiss, Leonard L. and Wilson, Walter T., **Synthesis of rainfall intensity-frequency regimes.** Wash., D. C., U. S. Weather Bureau, [**1955?**]. 4 p. 2 figs., 3 refs. **DWB**—A problem of importance to engineers is the lack of recording rain gage

data in many areas where local drainage systems must be designed. This preliminary report describes an objective method for estimating short duration rainfall intensities from usually available climatic data. Tests with independent foreign data indicate an average error of about 20% in estimates of 2-year 1-hour rainfall. *Subject Heading:* **1. Rainfall depth duration estimation.**—*Authors' abstract.*

8.1–290 551.**577.37**:551.**509.3**(761)

§Lott, George A., **The great-volume rainstorm at Elba, Alabama.** *Monthly Weather Review*, 82(6):153–160, June **1954.** 7 figs., 7 refs. **MH-BH**—The synoptic situation and extent of this storm which occurred on March 14, 1929, are analyzed. It is suggested that the long heavy rain was the result of a narrow band of strong warm air advection associated with an unstable warm air mass. *Subject Headings:* **1. Rainstorms 2. Synoptic studies 3. Elba, Alabama.**—*I.L.D.*

8.1–291 551.**577.37**:519.24

Ogawara, M. et al. (*Meteorological Research Inst.*), **Stochastic limits for maximum possible amount of precipitation.** *Papers in Meteorology and Geophysics*, Tokyo, 5(1):8–21, April **1954.** 9 figs., table, 20 refs., 34 eqs. **DWB**—The methods hitherto in use may be considered to have no reasonable theoretical background and by some examples we proved that the goodness of fit by any of them is not satisfactory in general. We proposed a new method which consists of the following steps: 1) We estimate a "normalizing transformation curve" by which the empirical distribution function of logarithms of observed variates is transformed to a normal one. 2) We extrapolate the normalizing transformation curve to an unknown region by utilizing the Fisher-Tippett limiting distribution function for the largest member of a sample. 3) By a two-sample theory we give the stochastic limits for the transformed normal variates corresponding to any given probability. 4) Lastly we transform the stochastic limits inversely to that for amount of precipitation. The above method is based on the stability and randomness of observed time series; if it is not stationary we should use the data in the "recent stationary period," and if it has any autocorrelation, firstly we should estimate the type of the stochastic process and then we use a generalized formula for the stochastic limits according to the type. *Subject Headings:* **1. Maximum possible precipitation 2. Statistical methods.**—*Authors' abstract.*

8.1–292 551.**577.37**:551.**579.4**(54)

§*Parthasarathy, K. (*Met. Office, New Delhi*), **Weather in relation to the floods in Bihar, Bengal and Assam during July and August 1954.** *Indian Journal of Meteorology and Geophysics*, Delhi, 5(4):329–336, Oct. **1954.** 3 figs., 2 tables, 2 refs. **DLC**—Daily rainfall data for July 19–31, 1954 and Aug. 19–31, 1954 for 20 stations in Nepal, N. Bihar, N. Bengal and upper Assam show excessive daily and total amounts, especially in July and lesser amounts, but enough to produce record floods from already soaked ground and swollen rivers, in late August. Two synoptic charts (July 11 and Aug. 24, 1954) show antecedent conditions for flood-producing rains in the foothills of the Himalayas. The monsoon causes rains over all of the area but during the "Break," or westerly trough invasions, rains are often heavy in the foothills and intensify in the Himalayas. These floods were greatest in the memory of man, for the area. *Subject Headings:* **1. Flood producing storms 2. Monsoon rains 3. Record rainfall 4. Bengal, India 5. Assam, India.**—*M.R.*

8.1–293 551.**577.37**:551.**553.21**(547)

Record monsoon rainfall in Bombay in 1954. *Indian Journal of Meteorology and Geophysics*, Delhi, 6(1):68, Jan. **1955.** table. **DWB, DLC**—The rainfall of Bombay (Colaba) during the monsoon period June–Sept. 1954 was 134.78 in., the highest recorded hitherto. A table gives the monthly rainfall for the five years since 1846, during which monsoon rainfall exceeded 100 in. *Subject Headings:* **1. Rainfall extremes 2. Monsoon rains 3. Bombay, India.**—*I.L.D.*

SNOW

See also: **Snow, ice, permafrost** (SIPRE), 8.1–55; **Snow damage to wheat** (Kusakabe), 8.1–96; **Snow damage protection** (Nakano), 8.1–100; **Drop size distribution in clouds** (Khrgian, Mazin), 8.1–279; **Terrain and snowpack water equivalent** (Mixsell), 8.1–325; **Unfavorable climatic characteristics** (Sapozhnikova), 8.1–336.

8.1–294 551.578.4:551.556.4:551.554

Hirata, Tokutaro, **Snow drift.** *Seppyo* (*Snow and Ice*), Tokyo, 12(5):165–167, **1951.** tables, refs., eqs. In Japanese. **DWB**—The distribution of the space density of snow raised from the ground during drifting is studied. The vertical density profile in the turbulent layer is expressed by the logarithmic law. *Subject Headings:* **1. Drifting snow profiles 2. Turbulence effects.**—*H. Arakawa.*

8.1–295 551.578.41

Hirata, Tokutaro, **Falling speed of snow flakes.** *Seppyo* (*Snow and Ice*), Tokyo, 12(5): 168–169, 1951. In Japanese. **DWB**—Based on the data on the falling angle of snowflakes by Takahashi, *Seppyo* (*Snow and Ice*), 1951, the author computed, tabulated, and discussed the falling speed of snow flakes. *Subject Heading:* **1. Snowflake velocity.**—*H. Arakawa.*

8.1–296 551.578.41:778.31(023)

Hubbard, Clarence T., **Snowflake sonata.** *Connecticut Circle*, New London, Conn., 18(1):43, 52, Jan. **1955.** photo. **DWB**—Popular article on snowflakes and snow crystals, with illustrations of unusual forms and comments on snowflake photography. *Subject Heading:* **1. Snowflake photography.**—*M.R.*

8.1–297 551.578.41

Kojima, Kenji, **On the shape of cloud particles frozen to a snow crystal.** *Low Temperature Science, Ser. A, Physical Sciences*, Sapporo, Japan, 13:111–114, **1954.** 4+figs. (incl. photos). In Japanese. **DWB**—Excellent photos show tiny globules and regular shaped crystals frozen to surface of much larger regular forms of snow crystal. *Subject Headings:* **1. Snow crystal growth 2. Snow crystal microphotographs.**—*M.R.*

8.1–298 551.578.46:551.43:551.583.2(63) 551.583.2:551.311.12

†Hövermann, Jürgen, **Über die Höhenlage der Schneegrenze in Aethiopien und ihre Schwankungen in historischer Zeit.** [The height of the snow line in Ethiopia and its variation during historic time.] *Akademie der Wissenschaften zu Göttingen. Mathematisch-Physikalische Klasse, Nachrichten, IIa*, No. 6:111–137, **1954.** fig., table, bibliog. p. 135–137. **DLC**—The height of the snow line in Ethiopia is studied on the basis of data contained in travel accounts written between 1600 and the present, and upon the expeditions made by the author in 1953 to northern Ethiopia and Eritrea. The author discusses the height of the snow line up to the end of the 18th century and during the 19th century, the analysis of the snow line from the 16th century to the present, the relationship between snow line variations in Ethiopia and the Nile flood and morphological traces of historical glaciation. *Subject Headings:* **1. Snow line variations 2. Glacier variations 3. Ethiopia.**—*I.L.D.*

HYDROMETEOROLOGY

See also: **Water investigations** (Blizniak), 8.1–9; **Hydrology and met.** (Domanevskiĭ), 8.1–10; **Apollov, B. A.** (Samoĭlov), 8.1–45; **Weather and circulation, Dec. 1955** (Andrews), 8.1–204; **Weather and floods** (Parthasarathy), 8.1–292; special bibliography on **Solar relations with weather,** p. 95.

8.1–299 551.579.2:551.509.59(521.16)

Inawashiro, Japan [and] Fukushima, Japan. Weather Stations, **On the snow survey over the Urabandai area.** *Journal of Meteorological Research*, Tokyo, 6(10/11):482–495, Dec. **1954.** figs., tables, 4 refs., eqs. In Japanese; English summary p. 482. **DWB.** Also issued as: *Sendai, Japan. Central Meteorological Observatory, Bulletin of the Meteorological*

Society for Research of Tohoku District, 8(2):482–495, Jan. **1955. DWB**—In the winter of 1943 the snow survey was made to gather the necessary data to know the water amount of lakes in the Urabandai area. This paper presents the principal results of the survey. Results are as follows: 1) variation of snow depth and water equivalent of snow with height above sea level are shown in figs.; 2) a forecasting formula of water stage of Lake Hibara was obtained as a linear function of the water equivalent of snow over drainage area of Lake Hibara and the average total precipitation at three selected stations; 3) observational and estimated error of snow survey were examined. *Subject Headings:* **1. Snow surveys 2. Snow melt runoff 3. Snow melt formulas 4. Urabandai, Japan.**—*Authors' abstract.*

8.1–300 551.579.4(523):551.509.5

Fukunaga, Mitsuo, **On the water-level forecasting in the upper Yoshino River.** *Journal of Meteorological Research*, Tokyo, 6(8):396–400, Nov. **1954.** 9 figs., 2 tables. In Japanese. **DWB**—To predict the water level, the relation between runoff and the amount of areal rainfall or the intensity of areal rainfall is studied for upper Yoshino Basin. *Subject Headings:* **1. River level forecasting 2. Yoshino River, Japan.**—*H. Arakawa.*

8.1–301 551.579.4

†Pardé, Maurice, **Sur les progrès récents de l'hydrologie fluviale.** [Recent progress in river hydrology.] His Études et Mémoires, Pt. 3, [**1955?** Privately printed?] p. 99–169. foot-refs. Also Section A, **Development de l'hydrométrie dans le monde.** [Development of hydrometry in the world.] p. 99–105, has innumerable references. **DWB**—A major survey of literature on runoff and floods in river basins of various continents and countries and especially in the U. S. and France together with discussion of recent advances in measurement, reporting and forecasting floods of all types—flash floods, snow melt runoff and normal storm rainfall floods. Statistical problems in hydrologic practice and philosophical considerations in attaining more perfect estimation and forecasts are considered at length. Regular publications giving hydrometric data are thoroughly described by country and institution. *Subject Headings:* **1. Hydrometeorology 2. Hydrologic progress 3. Hydrologic publications 4. Floods.**—*M.R.*

8.1–302 551.579.5:551.508.7

Bac, Stanisław and Marcilonek, Stanisław, **Przebieg procesów kondensacji pary wodnej w piaskach i żwirze: Studium na postawie Mynikow badań lizymetrycznech.** [The condensation process of water vapor in sand and gravel: a study based on lysimetric research.] *Przegląd Meteorologiczny i Hydrologiczny*, Warsaw, 8(2):107–134, **1955.** 7 figs., 11 tables, 6 refs. Russian and English summaries p. 129–134. **DWB, DLC**—Method and results of an investigation of the processes of condensation carried out with the aid of lysimeters. It has been shown that: 1) characteristics of the process (income and loss of heat) and extent of water vapor condensation depend in large measure on the size of the soil particles; in the period May–Oct. the condensation of water vapor was calculated to amount to 33 mm in gravel, 25 mm in large grained sand, and 27 mm in medium grained sand; 2) the condensation process depends on the interaction of climatic factors; the highest values of condensation occur in June and Sept.; 3) the soil humidity resulting from condensation of water vapor is accessible to roots of plants while rain often evaporates from the surface and does not reach the roots. *Subject Headings:* **1. Condensation processes in soil 2. Soil moisture 3. Lysimeter investigations.**—*A.M.P.*

8.1–303 551.579.5:631.6

Hogg, W. H., **Irrigation needs in the South west Province.** Great Britain. National Agricultural Advisory Service, South West Province, Feb. **1956.** 6 p. fig., 4 tables, ref. Mimeo.—A map of the frequency of irrigation need (years in 10) is compiled for Eng. by PENMAN's method. It varies from <5 in S.W., W. and N. to >9 in the S.E. Tables show for sites in the southwest the number of years in 20 when need exceeds 0, 2, 4 and 6″, maximum irrigation required in dry years, maximum requirements in 2 and 4 weeks, and irrigation schedules. *Subject Headings:* **1. Irrigation needs 2. England.**—*C.E.P.B.*

8.1–304 551.579.5:551.501

Konček, Mikuláš, **Index zavlaženia.** [Moisture index.] *Meteorologické Zprávy*, Prague, 8(4):96–99, Aug. **1955.** 10 figs., 3 tables, 4 refs. Russian and German summaries p. 96. **DWB**—The author advances a simple method for numerical computation of soil moisture from data on precipitation amount, mean temperature and average wind speed during the growing season. The results are in excellent agreement with THORNTHWAITE's moisture index, the scale being three times as sensitive as THORNTHWAITE's. Practical applications of the index are shown on several examples (featuring data for Czechoslovakia). *Subject Headings:* **1. Moisture index 2. Soil moisture measurement.**—*Trans. of author's abstract.*

8.1–305 551.579.5:631.67

Medvedev, V. P., **Sravnitel'noe izuchenie rezhimov orosheniia iuzhnykh chernozemov Zavolzh'ia.** [Comparative study of the irrigation regime of southern chernozem in the Trans-Volga region.] *Pochvovedenie*, Moscow, No. 11:48–54, Nov. **1955.** 4 tables. 8 refs. **DLC**—The author presents the results of an experimental study made in the Bol'shoĭ Irgiz valley on the left bank of the Volga to determine the soil moisture regime of summer wheat when either water charging or vegetational irrigation is employed and to investigate such physical characteristics of soil as volume weight, porosity, aeration, etc. with reference to the effect of sprinkling upon the physical properties of soil and the determination of sprinkling norms. Data on the moisture properties of the experimental chernozem plots, the water requirement of summer wheat and the speed of water penetration into soil are presented. *Subject Headings:* **1. Soil moisture requirements 2. Irrigation 3. Wheat 4. Volga Region, U.S.S.R.**—*I.L.D.*

8.1–306 551.579.5:551.501

U. S. Weather Bureau, **Kansas soil moisture tests, April 1955.** Its *Weekly Weather and Crop Bulletin*, 42(18):8, May 2, **1955.** table. **DWB**—Below-average soil moisture reserves throughout the western two-thirds of Kansas were shown by soil moisture tests taken during April 11–16, 1955. The values of moisture content determined for the various depths—namely, the top 6 in., the second 6 in., the second foot, third foot and fourth foot are classed as moderately wet, wet or very wet. The tests were made every 8 m over a distance of about 3000 m by field crews working cooperatively from the Kansas State Board of Agriculture and the U. S. Agricultural Marketing Service. A table showing the moisture conditions in the western two-thirds of Kansas in April 1954 and April 1955, namely: the average depth to dry soil, to slightly damp soil (in in.) and the moisture content of soil (percentage) is appended. *Subject Headings:* **1. Soil moisture measurement 2. Western Kansas.**—*A.M.P.*

8.1–307 551.58

Gregor, Alois, **Zásady klimatologických průzkumných prácí.** [Methods of climatological research.] *Meteorologické Zprávy*, Prague, 9(1):15–18, **1956.** 2 figs. Russian and German summaries p. 15. **DWB**—Progress in methods of urban, medical and agricultural climatology developed in Czechoslovakia during the last 30 years are reviewed. *Subject Heading:* **1. Climatological research.**—*Trans. of author's abstract.*

8.1–308 551.58:656.71(43)

Regula, Herbert, **Wetter und Luftverkehr: eine Schlechtwetterstatistik deutscher Verkehrsflughäfen.** [Weather and air traffic: bad weather statistics of German airfields.] *Umschau*, Frankfurt a.M., 56(15):449–451, Aug. 1, **1956.** 3 figs. **DLC**—Higher landing speeds have increased danger of poor visibility and low ceiling. Take-off depends on winds. Diagrams show monthly frequency of bad weather at German airports, hourly frequency by months at Hamburg, and surface velocity wind roses in Oct. at 4 places. The latter illustrate dependence on topography. *Subject Headings:* **1. Airport climatology 2. Germany.**—*C.E.P.B.*

8.1–309 551.58(51)

Zaĭchikov, V. T., **Klimatologiia v Kitaĭskoĭ Narodnoĭ Respublike.** [Climatology in the Chinese People's Republic.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geogr.*, No. 3:37–40, **1953.** fig. **DLC.** Also: Saidek, B., **Klimatologia w Chińskiej Republice Ludowej.** *Przegląd*

Meteorologiczny i Hydrologiczny, Warsaw, 7(1/2):67–71, **1954. DWB, DLC**—An outline of the historical development and a survey of the present state of the science is presented. Although early observations of hoar frost, snowfall and wind speed (on the Grand Canal) are known to have been carried on for a very long time (since 900) and many meteorological instruments (except barometers and thermometers) were invented by the Chinese, the actual development of climatology was greatly influenced by the Russians, especially after the creation in 1928 of the Scientific Research Institute in Peking. Since then more than 400 works on climatology and meteorology have been published dealing with questions of synoptic processes, atmospheric circulation, climate, weather, etc. But real progress in these sciences began in 1949 after the transfer of meteorological observations to the Meteorological Service and the concentration of climatic investigations in the Institute of Geophysics. Most of the climatological works deal with the study of atmospheric circulation, especially with monsoons and typhoons and their relation to precipitation, questions of dividing the country into climatic zones (important in view of the development of agriculture), and studies of climatic conditions of individual regions. A map of China divided into climatic zones is included. SAIDEK's paper is a summary of ZAĬCHIKOV's article. *Subject Headings:* **1. Climatology 2. Climate of China 3. China.**—*A.M.P.*

CLIMATOLOGY AND BIOCLIMATOLOGY

CLIMATOLOGY

See: **Weather problems** (U. S. W. B.), 8.1–107.

CLIMATIC ZONES

8.1–310 551.581:551.521

*Dirmhirn, Inge, **Zum Strahlungsklima des Zirbitzkogels.** [Radiation climate of Zirbitzkogel.] *Sonnblick-Verein, Vienna, Jahresbericht*, 49/50:50–55, **1951–1952,** pub. **1954.** 3 figs., tables, 3 refs. **DLC**—Solar and diffuse radiation on Zirbitzkogel peak (2397 m) were measured by means of a Robitzsch actinograph and a pyranometer. The values presented and discussed are: daily totals of solar and diffuse radiation with a clear sky, daily total radiation with cloudy sky and with variable cloudiness, maximum intensities of global radiation (with indication of time of day and amount of cloudiness), and monthly totals of global radiation. *Subject Headings:* **1. Radiation climate 2. Zirbitzkogel Peak, Austria.**—*G.T.*

8.1–311 551.581(213)

Portig, W., **Tropenwetter.** [Tropical weather.] *Meteorologische Rundschau*, Berlin, 7(5/6):102–103, May/June **1956. DLC**—The weather in the tropics is as variable as in temperate regions. It does not depart so far from normal, but rainfall in the same month in different years may be very different. Examples of variable weather are given (apart from hurricanes). Forecasting needs as careful examination of synoptic charts as elsewhere, and weather types must be described (as done in Salvador). *Subject Heading:* **1. Tropical meteorology.**—*C.E.P.B.*

CLIMATE OF PARTICULAR PLACES

See also: **Climate of central Canada** (Kendrew), 8.1–14; **Ships' hold climate** (Rodewald, Bullig), 8.1–73; **Bering Sea and Strait Pilot** (Gr. Brit. Hydrog. Dept.), 8.1–75; **Weather and fuel requirements** (Pallot), 8.1–106; **Global weather** (Schumann), 8.1–125.

8.1–312 551.582.1(71)

*Thomson, Andrew, **Climate of the Hudson Bay region.** *Royal Society of Canada, Transactions*, Ser. 3, Vol. 48, June **1954.** 7 p. fig., table, 7 refs. **DLC**—The history of weather observations in the Hudson Bay region is outlined. A quantitative discussion of precipitation, temperature (isotherms of mean annual temperature being given), of climatic change, of fog and of the climate of the east and west shores is presented. Data on clearing and reappearing

of ice at Chesterfield and Churchill are given. *Subject Headings:* **1. Climate of Hudson Bay Region 2. Hudson Bay Region, Canadian Arctic.**—*I.L.D.*

8.1–313 551.582.1(771)

Verber, James L. (*Ohio Dept. of Natural Resources, Shore Erosion Div., Sandusky, Ohio*), **The climates of South Bass Island, western Lake Erie.** *Ecology*, Durham, N. C., 36(3):388–400, July **1955.** 7 figs., 2 tables, 20 refs. **DWB, DLC**—The author describes the macro- and micro-climate of South Bass Island. The former includes a description of the temperature, precipitation, evaporation, frost-free period, fog, winds, solar radiation and water temperatures. The latter, based upon data from 37 temperature stations on the island, is analyzed. Temperature inversions and hourly, daily and monthly temperatures are described. Isotherms of monthly microclimatic temperatures are presented. *Subject Headings:* **1. Climate of South Bass Island 2. Microclimatic studies 3. South Bass Island, Ohio.**—*I.L.D.*

8.1–314 551.582.2:79(94)

*Australia. Meteorological Branch, **Climatological data for Melbourne with comparable data for Australian capital cities, main towns and selected cities of the world.** Australia, Commonwealth Bureau of Meteorology, **1955.** 64 p. figs., mostly tables. **DWB**—Climatic data (mean maximum and minima, extreme maxima and minimum temperature, average rainfall, relative humidity, wind, sunshine, cloud cover, evaporation and some other data) are given for Melbourne and Ballarat (64 mi WNW of Melbourne) where Olympic Games will be held in Nov. and Dec. 1956, and similar tables of monthly and annual mean or extreme data for Canberra, Adelaide, Brisbane, Hobart, Perth, Sydney, Alice Springs, Cairns, Darwin, Kalgoorlee, Newcastle and othe Australian stations and Athens, Berlin, Buenos Aires, Calcutta, Capetown, Chicago, Djakarta, Karachi, London, Madrid, Manila, Montreal, Moscow, New York, Paris, Rio, Rome, San Francisco, Singapore, Stockholm, Tokyo, Valparaiso, Vancouver, Wellington, New Zealand, etc. Tables give number of hours each of 19 airports in Australia were closed per year on account of weather. *Subject Headings:* **1. Climatic data 2. Climate of Australia 3. Melbourne 4. Australia.**—*M.R.*

8.1–315 551.582.2(866)

*Ecuador. Servicio Meteorológico, **Valores climatológicos de la Red Meteorológica de la Armada, 1949–1954.** [Climatological values from the Navy Meteorological Network, 1949–1954.] pub. [**1955?**] 2 sheets (fold.) Hectograph. **DWB**—Mean temperature, mean maximum, mean minimum and absolute range in temperature, direction and force of wind, relative humidity, dew point, total rain, maximum in 24 hrs, number of days with rain and mean for each month from 1949–1954 and for each year, are tabulated for San Cristobal, Esmeraldas, Manta, Puna and Guayaquil, Salinas and Puerto Bolivar, on 2 huge sheets. *Subject Headings:* **1. Climatic data tables 2. Ecuador. I. Blandin Landivar, Carlos II. Maggio Peña, Guillermo.**—*M.R.*

8.1–316 551.582.2(762)

*McWhorter, J. C., **Weather records at State College, Mississippi.** *Mississippi. Agricultural Experiment Station, Bulletin*, No. 530, Feb. **1955.** 19 p. tables, charts. **DWB**—Month by month analyses of records of maximum, mean and minimum temperature and precipitation from 1910–54 are shown on graphs, indicating extreme variability in these elements from year to year. Records have been kept at the Mississippi Agricultural Experiment Station at State College, Miss. in cooperation with the U. S. W. B. Temperature records from 1910-54, and precipitation from 1889-1954, are presented in tables and on graphs and analyzed. Yearly rainfall varies from 31″ to 76″ (average 51″). *Subject Headings:* **1. Climatic data summaries 2. Climate of State College, Miss. 3. State College, Miss.**—*M.R.*

8.1–317 551.582.2(45):519.2:681.177

Rosini, Ezio, **Alcuni risultati dell'esame statistico dell'osservazioni meteorologiche in Italia dal 1946 al 1953.** [Some results of statistical analysis of meteorological observations in Italy from 1946 to 1953.] *Rivista di Meteorologia Aeronautica*, Rome, 15(1):32–42, Jan./

larch 1955. 6 figs. French, English and German summaries p. 43. **DLC.** (Also in: taly. Servizio Meteorologico dell'Aeronautica, **Il Servizio Meteorologico dell'Aeronautica aliana alla X Assemblea Generale U.G.G.I.** pub. Rome, 1954. p. 53–63. 8 figs. English ummary p. 53.) **DWB**—Using the "punched card machine pool" of the Weather Service, the uthor summarized weather reports of 66 stations for the period 1946–1953 in order to establish basis for a regional weather analysis of the Italian peninsula. Graphs showing the annual ariations of the meteorological variables for Italy, the mean monthly values of each of the ariables for the period 1946–1953 for representative stations within each region of Italy, onthly frequencies of the individual variables, etc. are presented. *Subject Headings:* **1. Sta-stical analysis 2. Punched card analysis 3. Italy.**—*I.L.D.*

8.1–318 551.582.2(761)

*U. S. Weather Bureau, **Climatological summary, Dothan, Alabama, 1902–1954.** Mont-omery, Alabama, U. S. Weather Bureau, 1955. 24 p. figs., numerous tables. **DWB**—thorough analysis of over 50 yrs of records of temperature, precipitation, wind, dew, frost, umidity, sleet, snow, etc. Hourly dry and wet bulb, dew point and relative humidity for 940–52 are given in tables for each month and shown on graphs for spring, summer, autumn nd winter and for the year, respectively. Freeze dates, sunrise and sunset, extremes of emperature and of precipitation as well as averages are given in tables. A short discussion f the climate, topography, exposures, diurnal temperature fluctuation, degree days for heating nd for peach dormancy, hail, etc. by ARTHUR R. LONG of W.B.O., Montgomery, Ala., is ncluded. The 8 observers, 1940 when CAA took over, are listed. *Subject Headings:* **Climate of Dothan, Alabama 2. Dothan, Alabama.**—*M.R.*

CLIMATIC CHANGES

See also: **Ross glacier** (Brown), 8.1–80; **Height of snow line, Ethiopia** (Hövermann), 8.1–298; special bibliography on **Solar relations with weather,** p. 95.

8.1–319 551.583:551.311.182

Anosova, L. S., **Izmenenie srokov vskrytiia i zamerzaniia r. Zapadnoĭ Dviny v sviazi s otepleniem klimata.** [Change of the breakup and freeze-up dates of the Western Dvina iver in relation to the warming of the climate.] *Meteorologiia i Gidrologiia*, Leningrad, No. :45–46, Nov./Dec. 1955. table, refs. **DWB, DLC**—A table is presented showing the decadal eviations in days from mean dates of the breakup and beginning of freezing up and mean dates f the Western Dvina River at Riga from 1711 to 1950. The mean date of breakup for 1911–950 is 10 days earlier than the mean for 200 yrs. The duration of freeze-up during the 20th entury is 17 days less than during the preceding century. *Subject Headings:* **1. Climatic ariations 2. River ice breakup 3. Freezing of rivers 4. Dvina River, Latvia.**—*I.L.D.*

8.1–320 551.583.13:517.512.2

Polli, Silvio, **La realtà fisica del ciclo climatico di 5, 6 anni.** [The physical reality of the .6 year climatic cycle.] *Trieste. Istituto Geofisico, Pubblicazioni*, No. 213, 1946. 12 p. 9 refs. Italian, English and German summaries p. 3. **DLC.** Also issued in: *Geofisica Pura e pplicata*, Milan, 8(3/4), 1946. **DWB**—Periodic analysis a la VERCELLI is applied to 30 long eries of pressure, temperature, humidity, evaporation, precipitation, sea level and other data .e., Prague, temperature, 1775–1938; Trieste, temperature and precipitation, 1841–1941; adua, precipitation, 1727–1940, etc.). Conclusion is that a 5.6 year cycle appears in all ements in all parts of the earth. Results of similar analyses by ABBOT, LABROUSTE, DOUGLAS, HAW and others are cited. *Subject Headings:* **1. Climatic cycles 2. Periodogram analysis.** -*M.R.*

8.1–321 551.513:551.583.3

Majdanowski, Stefan, **Zagadnienie ogólnej cyrkulacji atmosferycznej w czasie ostatniego ododwacenia.** [General atmospheric circulation during the latest glacial period.] *Przegląd eograficzny*, Warsaw, 27(1):55–80, 1955. 3 figs., table, 49 refs. Russian and English ummaries p. 75–80. **DLC**—The author presents a chart of the general atmospheric circulation

during the latest glacial period, the degree of the drop of temperature and pressure, and the decrease of precipitation at individual latitudes. He asserts that the zonal differences in the cooling, in the precipitation conditions in the tropics, as well as the considerable dryness of the atmosphere over the greatest expanses of the globe were the result of the displacement of the planetary circulation to the tropics, the narrowing of middle latitude zones, and the formation of glacial anticyclones. The considerable dryness of the atmosphere in the glacial periods which did not prevent the development of ice cover seems to exclude the hypothesis of a stronger warming up and increased air exchanges at the beginning of each glaciation. The author adheres to the idea that the weakening of solar activity was the direct cause of glaciation. *Subject Headings:* **1. General circulation 2. Glacial periods.**—*A.M.P.*

8.1–322 551.583.3

†*Tullström, Helge, **Kvartärgeologiska studier inom Rönneans Dalbäcken i Nordvästra Skane.** [Quaternary studies in the valley of the Rönne River in N.W. Skane.] *Sweden. Geologiska Undersökning, Stockholm, [Publications], Ser. C. Avhandlingar och Uppsatser*, No. 530; *Årsbok*, 47(1), **1953.** 73 p. 15 figs., tables, bibliog. p. 71–73. **DWB, DLC**—The results of detailed field studies conducted during the period 1949–1951 are discussed. Sediments and topographical profiles indicate exposure of the valley to several ice ages. The old Baltic glacial stream is believed to have melted completely in Skane. The subsequent Meridian-ice that presumably originated from sea ice mixed with snow and firn gradually compressed into a fairly clean 150 m thick ice mass under which the ridges originated in subglacial tunnels. It is suggested that this ice mass extended out into the Kattegat. *Subject Headings:* **1. Quaternary glaciation 2. Rönne River Valley, Sweden.**—*W.N.*

MICROCLIMATOLOGY

See also: **Micromet. investigations** (Peerlkamp), 8.1–15.

8.1–323 551.584.2:551.588.2(97)

Shaw, P. J. R. (*Central Met. Bureau, Melbourne*), **Some effects of topography on weather observations at Heard Island.** *Australian Meteorological Magazine*, Melbourne, No. 10:34–46, Sept. **1955.** 8 figs. **DWB**—A comparison is made between the anemograph records, observations of upper winds and cloud movement, and cloud distribution. Deductions are made regarding the relationship between the observed wind and that which would prevail if the mountainous mass of the island were absent. Use is made of the reports from Kerguelen so that an appreciation is obtained of the synoptic situation at the time. Fluctuations of surface temperature, relative humidity and atmospheric pressure are shown to be related to the effect of topography on the air stream before it reaches the observing site. *Subject Headings:* **1. Mesoclimatology 2. Topographic effects 3. Heard Island.**—*Author's abstract.*

8.1–324 551.584.3:551.45

Dzerdzeevskiĭ, B. L., **Teplovoĭ balans i mikroklimat limana i sukhoĭ stepi v Prikaspii.** [Heat balance and microclimate of a silted estuary and a dry steppe in the Caspian region.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geog.*, No. 2:15–28, March/April **1954.** 11 figs., 4 tables, 3 refs. **DLC** Results of field observations made in the summer of 1952 in the Trans-Volga steppes near Kazatskoe, to determine the difference in the heat balance and the quantitative differences in the meteorological regime (characteristics in the lowest atmospheric layer up to 8 m high) over a dry steppe and a naturally moistened silted estuary, and to obtain quantitative data on their interaction for evaluating the efficient sizes of irrigated areas are presented. They show important differences depending on the microrelief, the kind of soil and vegetation, the distance from the boundary of the moistened area, also the length of the air flow over the dampened underlying surface and, finally, the distance at which the moistening effect of the silted estuary is still noticeable in the dry steppe. Author concludes that the most advantageous size of irrigated areas is 1.5–2.5 km at a distance of 1 to 1.5 km from one another. This would diminish the harmful effect of droughts and dry winds and improve the yield. *Subject Headings:* **1. Steppe microclimates 2. Silted estuary microclimates 3. Irrigation effects 4. Heat balance 5. Caspian Region, U.S.S.R.**—*A.M.P.*

8.1–325 551.584.31:551.578.46

Mixsell, J. W., **Influence of terrain characteristics on snowpack water equivalent.** *U. S. Corps of Engineers and U. S. Weather Bureau, Cooperative Snow Investigations, Research Note,* Feb. 9, **1951.** 9+p. 2+tables. **DWB**—Snow water equivalent increases with height (1 to 3″ per 100′), aspect (0.2 to 1.6″ per 10° deviation from south), curvature (3 to 6″ for each of five curvature classes from convex to concave) and decreases with slope (0.5″ per 1%). Exposure seems to decrease the water equivalent. Some effect of vegetation was found. A multiple regression equation, involving the important factors is developed. The study is based on many snow courses over a period of several years. *Subject Headings:* **1. Topographic effects 2. Snow courses 3. Water content of snow. I. Central Sierra Snow Laboratory.** —*A.A.*

8.1–326 551.584.41:551.524

Primault, Bernard, **L'influence de l'insolation sur la température du cambium des arbres fruitiers.** [Influence of insolation on the temperature of the cambium of fruit bearing trees.] *Revue Romande d'Agriculture de Viticulture et d'Arboriculture,* Lausanne, 10(3):26–28, **1954.** graphs, photo. **DA, DWB**—Thermocouples placed at 10 cm, 1.3 m and 4.0 m above ground on the S.W. and N.E. side of the trunk (at Zurich) were used to study differences between shaded, partly shaded and unshaded portions of the trunk on days with clear and cloudy sky at different seasons. Recordings were made every 3 min. from July 15, 1952 to Aug. 1, 1953. Curves show the amplitude of the diurnal cambium temperature cycle compared with air temperature and with different exposure to sun, and lag in changes in cambium temperature. White coatings of paint up to 1.7 m height made some difference. Straw matting protection reduced amplitude of fluctuations 29%, whereas the paint reduced it 35%. Painting on S.W. side only is recommended but painting on all sides, and to top of tree, is said to retard floration 8–12 days. *Subject Headings:* **1. Cambium temperatures 2. Fruit trees.**—*M.R.*

CLIMATIC CLASSIFICATION

8.1–327 551.585(44)

Arléry, R., **Quelques remarques à propos de l'application des conceptions de C. W. Thornthwaite à une classification des climats de la France.** [Application of Thornthwaite's concepts to a classification of the climates of France.] *La Houille Blanche,* 8(B):713–716, Nov. **1953.** 3 figs., table. **DLC**—The author explains THORNTHWAITE's method of climatic classification. The mean water balance for Angoulême (1891–1930) is drawn in a table and a diagram. Maps of potential evapotranspiration and of water deficiency for France are presented. The author also shows that although THORNTHWAITE's method is chiefly intended for agricultural purposes it can also be usefully applied to hydrologic calculations. *Subject Headings:* **1. Climatic classifications 2. Thornthwaite's classification 3. France.**—*G.T.*

8.1–328 551.585(82)

Czajka, Willi and Verwoorst, Frederico, **Die naturräumliche Gliederung Nordwest-Argentiniens.** [The natural regions of N.W. Argentina.] *Petermanns Geographische Mitteilungen,* 100(2):89–102, **1956.** chart, fig., 8 photos, table. **DLC**—N.W. Argentina is divided into 15 orographic regions, for 14 of which cross-sections show height stages, vegetation and ice. The influence of topography on climate is discussed, including aridity and humidity, latitude zones (north and south sub-tropics) (with temperature table), elevated west wind zone, height zones of weather and glaciation. To be continued. *Subject Headings:* **1. Climatic regions 2. Argentina.**—*C.E.P.B.*

8.1–329 551.585

Gregor, Alois, **Poznámky k mé klimatické bodovácí metodě.** [Note on my climatic classification method.] *Meteorologické Zprávy,* Prague, 7(5):138–140, **1954.** 2 figs., 5 refs. Russian and German summaries p. 138. **DLC**—Recapitulation of the author's bioclimatological evaluation scheme which he worked out some 25 yrs ago in connection with a drive for the popularization of mountain vacationing. Devised as it was for the specific purpose of mountain bioclimatology, the method is not generally applicable to climatic classification. *Subject Headings:* **1. Climatic classifications 2. Gregor's classification.**—*G.T.*

8.1–330 551.585

Mather, John R., **Preparation of climatic maps for various areas.** *John Hopkins Univ. Laboratory of Climatology, Publications in Climatology,* 7(3):403, **1954. DWB**—Climatic maps according to THORNTHWAITE's classification, covering potential evapotranspiration, moisture surplus and deficiency are available on file at the Laboratory prepared by a number of climatologists for China, Manchuria, Japan, Formosa, Korea, Australia and the Near and the Middle East. *Subject Headings:* **1. Thornthwaite's classification 2. Potential evapotranspiration 3. Asia 4. Australia.**—*A.A.*

8.1–331 551.585

Papadakis, Juan, **Contribución al estudio de los climas argentinos: tipos de régimen hídrico.** [Contribution to the study of Argentine climates: types of moisture regime.] *Argentina. Instituto de Suelos y Agrotécnia, Publicación,* No. 33, **1954.** Also issued as: *Revista de Investigationes Agrícolas,* 8(3):207–224, **1954.** map. **DWB** –Various climatic classifications are discussed with regard to their validity in describing the moisture regime of a place and most of them rejected. The system of MEYER (1926), PRESCOTT (1948–9) and the author (1948, 51, 52) which use the formula $P/20\ (V-v)$ where P is rainfall in mm, V = saturation vapor pressure for mean temperature of the month, and v is actual mean vapor pressure (in mm) is considered least objectionable. Using this saturation deficit formula, 41 moisture regimes are distinguished and charted for Argentina, each region being represented by a formula indicating the basic type of climate (isohygric, 27 areas; monsoonal, 12 areas; Mediterranean, 2 areas) by two letters, Is, Mo and Me, respectively; the months during which the place has a coefficient of >1.00 or <1.00 and those during which the coefficient is <0.50 or >0.50. Formulas are worked out for 131 stations and these listed under the proper one of the 41 regions, and discussed. *Subject Headings:* **1. Climatic classifications 2. Moisture deficiency 3. Argentina.**—*M.R.*

8.1–332 551.585

*Polli, Silvio, **Analisi periodale di tre serie climatiche centinnali, Milano 1851–1950.** [Periodic analysis of three series of hundred year climatic records, Milan 1851–1950.] *Geofisica e Meteorologia,* Genoa, 3(3):64–69, May/June **1955.** 3 figs., table, refs. **DWB**—The periodic analysis of VERCELLI consists of breaking up a curve into elementary components of quasi-periodic and quasi-persistent characteristics; this technique is applied to a hundred years record of mean annual atmospheric pressure. Temperature and precipitation measured at Milan during the interval 1851–1950. "There are obtained quasi-periodic and quasi-persistent components having annual periods of 35–22–11.2–8–5.6–4–3 -2." The physical reality of 35–22–16–11.5–8 and 5.6 years is indicated on the basis of criteria listed by S. POLLI. *Subject Headings:* **1. Climatic analysis 2. Climatic data 3. Long period records 4. Milan, Italy.**—*I.L.D.*

8.1–333 551.585

Rein, František, (*Czechoslovak Acad. of Science, Geophys. Inst.*), **Způsobyk lasifikace klimatu.** [Methods of climatic classification.] *Meteorologické Zprávy,* Prague, 9(1):5–8, **1956.** table, 29 refs. Russian and German summaries p. 5. **DWB**—Methods of climatic classification are reviewed and classified into four main groups (biological, biological-climatological, geographical-climatological and climatological) and several secondary groups. The problem of finding the method best suited for Czechoslovakia is discussed. It is believed that it would be best for agroclimatological purposes to divide the territory of Czechoslovakia first by specified temperature values and then further by precipitation variability or similar rainfall parameters, and additional elements. *Subject Heading:* **1. Climatic classification techniques.** —*Trans. of author's abstract.*

8.1–334 634.956:551.585.5(54)

Ahmad, Salah-Ud-Din (*Deputy Conservator of Forests, Pakistan*), **Dry afforestation in arid and semi-arid areas.** *UNESCO, Arid Zone Research, No. 5, Plant Ecology: Proceedings of the Montpellier Symposium,* p. 68–69. pub. **1955.** French summary p. 69. **DWB**—Afforestation experiments were made with tropical species in areas with 6–15 in. of rainfall.

Prosopis gave the best results. *Subject Headings:* **1. Arid zones 2. Afforestation 3. Pakistan** —*A.A.*

8.1–335 551.585.5:581.5(569)

Boyko, H., **Climatic, ecoclimatic and hydrological influences on vegetation.** *UNESCO, Arid Zone Research, No. 5, Plant Ecology: Proceedings of the Montpellier Symposium*, p. 41–48. pub. **1955.** 5 figs. French summary p. 47–48. **DWB**—Plant societies can give a rather reliable clue to climatic conditions. Factors involved are: precipitation, insulation, slope inclination, height above water table and soil properties. Micro-ecological surveys can be of great help for agricultural planning and also for microclimatic studies, especially in dry zones. *Subject Headings:* **1. Ecoclimatology 2. Arid zones 3. Israel.**—*A.A.*

8.1–336 551.585.5:551.578.46

Sapozhnikova, S. A., **O bor'be s neblagopriiatnymi osobennostiiami klimata.** [Prevention of unfavorable climatic characteristics.] *Priroda*, Moscow, 44(12):121–122, Dec. **1955. DLC**—A review of 3 pamphlets published by the Academy of Sciences in 1954 devoted to combating aridity, an unfavorable feature of the climate in regions where virgin and waste lands are now being brought under cultivation. 1) Denisov, P. S., **Prevention of aridity in Trans-Ural and Siberia** (78 p.), deals with the regulation of snow cover by planting 2–3 rows of long stalked plants; special methods of plowing and regulating spring floods by ice dams. 2) Krizer, R. E., **Estuary irrigation in Trans-Volga lands** (80 p.), discusses the question of irrigating large depressed steppe areas in spring by means of a system of low earth banks. 3) Shul'gin, A. M., **Soil climate and snow retention** (108 p.), considers the wintering of crops and the role of the snow cover. Snow retention is regarded as a means of protecting crops from freezing. Much attention is given to the meteorological aspect of the question. A summary of the relationship between soil surface temperature and the thickness of the snow cover is given. In the chapter dealing with the regulation of soil climate by snow retention, the main attention is directed to the strip method of snow conservation. *Subject Headings:* **1. Arid zones 2. Water conservation 3. Snow retention 4. Irrigation 5. U.S.S.R.**—*A.M.P.*

8.1–337 551.585.55:581.54(56)

Birand, Hikmet (*Inst. de Botanique, Univ. d'Ankara*), **Influence des précipitations sur le developpement de la végétation steppique et rôle du système des racines sur son hydration.** [Effect of rainfall on steppe vegetation and root system as a factor in its hydration.] *UNESCO, Arid Zone Research, No. 5, Plant Ecology: Proceedings of the Montpellier Symposium*, p. 60–63. pub. **1955.** English summary p. 62–63. **DWB**—A general ecological characterization of the steppes in central Anatolia. Annual rainfall of 200 to 350 mm is extremely variable and unsatisfactorily distributed over the year. A cryometric method was used to measure the osmotic pressure of the xerophilous plants in order to detect their water balance. *Subject Headings:* **1. Steppe vegetation 2. Arid zone ecology 3. Anatolia, Turkey.**—*A.A.*

8.1–338 551.585.55:551.311.2/3 631.4

†Tricart, Jean, **Géomorphologie dynamique de la Steppe Russe.** [Dynamic geomorphology of the Russian Steppe.] *Revue de Géomorphologie Dynamique*, Paris, 4(1):1–36, **1953.** 13 figs., tables, 40 refs. English summary p. 1–3. **DLC.** Also review of above article: C., C.A., **Ten thousand years of accelerated erosion.** *Geopraphical Journal*, London, 121(2): 241–244, June **1955. DWB**—A comprehensive description and analysis are given of the topography of the Russian Steppe with its flat, gently rolling plateaus and steep ravines in the west and the flat-bottomed dry, winding valleys, 10–90 km long, in the east. In Pt. 1 the author discusses first the two types of desiccation patterns—the ravines and the dry valleys (balka). Then he takes up various erosion processes at work—cracking by intensive desiccation in summer, frost heaving in winter and land slips and soil creep during snow melt in spring and after heavy rains in summer. Then factors favoring erosion such as climatic conditions, geological factors, winds, deforestation and agricultural practice are discussed at length. Pt. 2 deals with measures taken by the Soviet government against erosion—the plan for land reclamation—the construction of small dams against gullying and the planting of tree belts

for protection against wind and in order to modify the mesoclimate itself. *Subject Headings:* **1. Gullying 2. Wind erosion 3. Steppe climate 4. Soil conservation 5. U.S.S.R.**—*A.M.P.*

BIOCLIMATOLOGY

See also: **Water economy of tropical merino sheep** (Macfarlane et al.), 8.1–97; **Climatic effects on cows** (Smoliak, Peters), 8.1–98; **High altitude navigation** (Poppen), 8.1–103; **Weather and fuel requirements** (Pallot), 8.1 106; **Biol. effects of infrared radiation** (Knepple), 8.1–224.

8.1–339 551.586:551.588.7

Wulsin, Frederick R. (*Tufts College*), **Hot weather and high achievement.** *Florida Anthropologist*, 5(4):103–119, Dec. **1953.** 15 refs., 2 tables. **DLC**—In this discussion of the relationship between weather and climate and human civilization, the author reviews the physiological mechanism by means of which the human body adapts itself to a hot environment, the effect of clothing upon these physiological adaptation mechanisms and the record of great civilizations that have arisen and developed in hot climates. *Subject Headings:* **1. Climate and man 2. Environmental influences 3. Physiological climatology 4. Hot climates.**—*I.L.D.*

8.1–340 551.586:519.272

Picho, V., **Die stochastische Abhängigkeit in der Bioklimatologie. (Die Applikation der mathematischen Statistik in der Bioklimatologie.)** [Stochastic dependence in bioclimatology: the application of mathematical statistics in bioclimatology.] *Angewandte Meteorologie*, Berlin, 2(9):276–281, July **1956.** fig., 3 tables, 11 refs. **DLC**—Solar radiation is important because of ultraviolet effects on rickets and bone disease, which occur chiefly in smoky northern cities in winter. In a Czechoslovakian town monthly proportion of rickets has a total correlation of 0.83 with cloudiness and duration of sunshine. Ear, throat and nose infections have $T=0.78$ with mean temperature and relative humidity. The reality of these connections is shown by *t*-test. *Subject Headings:* **1. Bioclimatology 2. Statistical studies.**—*C.E.P.B.*

8.1–341 551.586:599.32

Thompson, Daniel Q., **The 1953 lemming emigration at Point Barrow, Alaska.** *Arctic*, Montreal, 8(1):37–45, Winter **1955.** 6 figs., table, 10 refs. **DLC**—This study of the ecology of the lemming emigration begun in May 1953 contains a few observations of the air temperature conditions during May and June 1953. *Subject Headings:* **1. Animal ecology 2. Lemmings 3. Temperature data 3. Pt. Barrow, Alaska.**—*I.L.D.*

8.1–342 551.586:595.7

Bertels Menschoy, Andrej (*Inst. Agronômico do Sul, Pelotas, R. Grande do Sul, Brazil*), **Trabalhos entomológicos no Instituto Agronômico do Sul.** [Entomological work at the Agronomy Institute of the South.] *Pelotas, Rio Grande do Sul, Brasil. Instituto Agronômico do Sul, Boletim Têcnico*, No. 10, May **1954.** 68 p. p. 26–35, **Considerações sôbre a ecologia entomológica.** fig., 7 refs.—A brief note mentioning the effect of temperature, humidity and solar radiation upon the physiological processes of insects. *Subject Headings:* **1. Insect bioclimatology 2. Brazil.**—*I.L.D.*

8.1–343 551.586:595.7

Pratt, Richard L., **Weather and Alaskan insects.** *U. S. Quartermaster Corps. Research and Development Branch. Environmental Protection Section, Report*, No. 156, Aug. 15, **1949.** 25 p. 13 figs., 6 tables. **DWB**—The relationship between meteorological conditions and the activities of Alaskan insects, especially mosquitoes, black flies and *Colicoides* was investigated in order to determine the most efficient water pool and stream temperatures under which mosquitoe larvae develop. An improved technique for measuring "degree hours" of temperature in pools where larvae live is proposed. In studying the effect of weather conditions upon insects, weather observations were made simultaneously with counts of insects, and the relationship between insect activity and individual weather variables are analyzed. Data on the

relationship between spray runs and wind and temperature lapse rates are also given. *Subject Headings:* **1. Insect climatology 2. Alaska.**—*I.L.D.*

8.1–344 551.586:599.32

Chew, Robert M. (*Biology Dept., S. Calif. Univ. at L. A.*), **The skin and respiratory water losses of *Peromyscus maniculatus sonoriensis*.** *Ecology*, Durham, N. C., 36(3):463–467, July **1955.** fig., 2 tables, 13 refs. **DWB, DLC**—A method is described for determining separately water losses from the skin and from the respiratory tract of small mammals. It consists of a body and head-lung chamber which are components of separate Haldane-type open circuits. Data for measurements of *Peromyscus* rain and water losses made at 28.6°C and 6% relative humidity are given in tables. The total water loss and water loss through skin and respiratory tract under laboratory conditions are discussed. *Subject Headings:* **1. Physiological climatology 2. Water losses of mice 3. Mice.**—*I.L.D.*

8.1–345 551.586:612.014.4

Predmerszky, Tibor, **Munkahelyek komfortjának jellemzése.** [Characterization of workroom comfort.] *Idojárás*, Budapest, 59(5):268-274, Sept./Oct. **1955.** 3 figs. Russian and English summaries p. 268. **DLC**—General principles of workroom comfort determination are reviewed and two special problems considered in particular: 1) measurement of infrared radiation near furnaces and 2) use of an index number accounting for the physical state of the surroundings as well as for the thermal equivalent of the worker's exertion. This index is used in determining the need for prescribing a 0.1% carbonated salt solution as drinking water to workers in hot workshops. *Subject Headings:* **1. Workroom comfort climate 2. Heat effects on man.**—*G.T.*

8.1–346 551.586:612.014.4:628.8(821.1)

Quintela, Roberto M. and Vasino, Cesar J., **Bases de la climatización artificial en Buenos Aires.** [Bases of artificial climatization in Buenos Aires.] *Meteoros*, Buenos Aires, 5(4):277–304, Oct./Dec. **1955.** 4 figs., 14 tables, 8 refs., 3 eqs. Spanish and English summaries p. 277. **DWB**—Applied climatology has, among others, the purpose of establishing climatic conditions by the convenient elaboration of data, for its use in the technique of engineering. In the present work the conditions for artificial climatization in Buenos Aires are studied beginning by a brief outline and discussion of principal investigations about artificial climatization carried out in our country and others, the relation between man and his climatic environment and some parameters which attempt to determine the degree of human comfort. After establishing indoor conditions, the problem of determining the basic ones of temperature and humidity in Buenos Aires during summer and winter is faced. It is intended, in the last part, to extend the results to the town surroundings and some considerations are stated about the reglementation that fixes the heating-days in Buenos Aires. *Subject Headings:* **1. Comfort climate 2. Acclimitization 3. Heating and ventilating 4. Buenos Aires, Argentina.**—*Authors' abstract.*

8.1–347 551.586:631:633.18:523.746(52)

Arakawa, H. (*Met. Res. Inst., Japan*), **On the relation between the cyclic variation of sunspots and the historical famines of the rice crops in Japan.** *Papers in Meteorology and Geophysics*, 4(3/4):151–152, Dec. **1953.** fig., table, 2 refs. **MH-BH**—Three historical famines caused by poor rice crops (cool wet summer) occurred during strong sunspot period. A sunspot period of extreme intensity is expected, and a tentative forecast for poor rice crops is offered. The sunspot peaks are classified into three groups: weak periods ($R<69$), normal ($69\leq R\leq 107$) and strong periods ($R>107$). *Subject Headings:* **1. Sunspot effects 2. Rice crops 3. Japan.**—*A.A.*

8.1–348 551.586:633

Shepperson, G., **The use of racks and tripods for haymaking.** *Agricultural Review*, London, 1(10):36-42, March **1956.** 2 figs., table, 29 refs. **DA**—On the average only one

fine spell of 3–5 days occurs in London area during haytime. Methods of drying reported on are vertical fences 6′ high and 8′ apart carrying 4 wires, hut racks, tetrapods and tripods. *Subject Heading:* **1. Hay drying.**—*C.E.P.B.*

8.1–349 551.586:634.9:581.5

Shcherbakov, I. P. et al. (*Akad. Nauk SSSR*), **Estestvennoistoricheskie usloviia raĭonov dubrav promyshlennogo znacheniia.** [Natural historical conditions of oak grove regions of industrial importance.] (In: Akademiia Nauk SSSR, Kompleksnaia Nauchnaia Ekspeditsiia po Voprosam Polezashchitnogo Lesorazvedeniia, 1949–, **Trudy.** Vol. 1, Pt. 2. Moscow, Akademiia Nauk SSSR, **1951.** p. 86–119. fig.) **DLC**—Presents results of investigations carried out by the "oak grove" party of a scientific expedition under the supervision of the author. The purpose was to determine the possibility and effectiveness of the development of oak groves of industrial importance, and tree species accompanying the oak, in different conditions of soil and climate in 3 geobotanical areas of the Stalingrad and Astrakhan Regions, chiefly in the Ergenin Hill land and the Green Ring of Stalingrad. Greatest importance is attributed to the quality of soils and to climatic conditions of the areas studied. The peculiar features of each season, their temperature, humidity, wind and precipitation regimes are described and analyzed in detail. Deficiency of moisture during all seasons is considered to be the most important limiting factor for the successful development of oak groves in these areas. Measures of snow retention are therefore of highest importance and must be carried out with greatest care and effort. *Subject Headings:* **1. Forest ecology 2. Oak groves 3. Stalingrad, U.S.S.R. I. Kleiman, V. S. II. Levina, E. F. III. Krukovskaia, Z. V. IV. Pavlova, N. P.**—*A.M.P.*

ENVIRONMENTAL INFLUENCES

See also: **Forest influence on air humidity** (Mrose), 8.1–99; **Snow damage protection** (Nakano, 8.1–100; **Topography and weather obs.** (Shaw), 8.1–323; **Weather and achievement** (Wulsin), 8.1–339.

8.1–350 551.588.1:551.513(82)

Schwerdtfeger, Werner and Vasino, Cesar J., **La variación secular de la continentalidad en la República Argentina.** [Secular variation of the continentality of Argentina.] *Meteoros*, Buenos Aires, 5(3):177–184, July/Sept. **1955.** 3 figs., 2 tables, 3 refs., 3 eqs. Spanish and English summaries p. 177. **DWB, DPU**—An analysis of 50 years of temperature records of 59 Argentine stations shows an increase of continentality in the western and a diminution in the northeastern region of the country. The phenomenon is related to a slight variation of some characteristics of the general circulation over the extratropical latitudes of South America, a variation which also affects the regime of rainfall, frequency of wind directions, interdiurnal variability of pressure and other elements. *Subject Headings:* **1. Continentality 2. General circulation variations 3. Argentina.**—*Authors' abstract.*

8.1–351 551.588.1(437)

*†Sládek, Jaroslav, **Thermická kontinentalita podnebí v Československu.** [Thermal continentality of the climate of Czechoslovakia.] *Meteorologické Zprávy*, Prague, 8(4):85–93, Aug. **1955.** 5 figs., 2 tables, 21 refs. Russian and German summaries p. 85. **DWB**—An index of continentality (K) was advanced by N. N. Ivanov in 1953 (*see item* 6.3–338, March 1955, *MAB*): $K = A_1 - A_0$, where A_1 is the yearly amplitude of atmospheric temperature at a given place and A_0 is the temperature amplitude for the entire latitude corresponding to that place. Positive values indicate continental and negative values indicate maritime climate. Data on temperature variations are presented for over 150 stations in Czechoslovakia and maps are drawn with isolines of continentality. Eastern Slovakia is situated around the zero isoline and values of continentality become increasingly negative to the west. The results are compared with those obtained with Gorczynski's method of thermal continentality classification. *Subject Headings:* **1. Thermal continentality 2. Czechoslovakia.**—*G.T.*

8.1–352 551.588.6:016

†Curtis, James D., **Forest management research by the Intermountain and Northern Rocky Mountain Stations: a bibliography 1912 through 1954.** *U. S. Forest Service. Intermountain Forest and Range Experiment Stations, Miscellaneous Publication*, No. 6, Aug. **1955.** 42 p. **DWB**—Contains 350 references to literature on various aspects of forest research including fire, disease and growing problems connected with weather and microclimatic effects of forests, arranged by author, with detailed subject index. Material is confined to papers published by members of the staff of the Intermountain Forest and Range Experiment Stations, Forest Management Division (and other divisions) since 1912 when it was established. *Subject Headings:* **1. Forest meteorology 2. Forest research bibliographies.**—*M.R.*

SYNOPTIC CLIMATOLOGY

See also: **Aeronautical met.** (Sperry Gyroscope Co.), 8.1–90.

8.1–353 551.589

Pinna, Mario, **Climatologia dinamica e geografia.** [Dynamic climatology and geography.] *Società Geografica Italiana, Rome, Bolletino*, Ser. 8, 8(4/5):143–152, April/May **1955.** 10 refs. **DWB**—The geographic basis of dynamic climatology as expressed in the interaction of air masses with underlying surface, the regional origin of cyclones, anticyclones and fronts, etc. is pointed out. The adoption by geographers of the methods and principles of dynamic climatology in the analysis and descriptions of regional climate is urged. *Subject Headings:* **1. Dynamic climatology 2. Geographical climatology.**—*I.L.D.*

8.1–354 551.589.1

Vowinckel, E., **Ein Beitrag zum jährlichen Witterungsablauf auf den Orcades del Sul.** Contribution to the annual weather sequence in the South Orkneys.] *South Africa. Weather Bureau, Notos*, 3(4):287–293, **1954.** 5 figs., 4 tables. German and English summaries p. 287. **DWB**—By means of daily pressure, temperature and precipitation values the normal weather sequence in the South Orkneys, the different seasons and their singularities are discussed. It was found that four seasons can clearly be distinguished and about 14 singularities occur in the course of the year. *Subject Headings:* **1. Singularities 2. Synoptic climatology 3. South Orkney Islands.**—*Author's abstract.*

MISCELLANEOUS

COSMIC INFLUENCES

See also: **Potential gradient at the earth's surface** (Koenigsfeld), 8.1–377; **Solar eclipse and atmos. disturbances** (Skeib), 8.1–391; special bibliography on **Solar relations with weather,** p. 95.

8.1–355 551.590.24

Dmitriev, A. A.; Bonchkovskaia, T. V. and Kalinina, T. A., **Izmeneniia temperatury i davleniia vo vremiia polnogo solnechnogo zatmeniia.** [Changes in temperature and pressure during a total solar eclipse.] *Akademiia Nauk SSSR, Doklady*, 103(4):597–600, Aug. 1, **1955.** 3 refs., 26 eqs. **DLC**—Formulas are developed for calculating the atmospheric temperature and pressure at the earth's surface during a complete eclipse. Examples of critical calculations are presented. *Subject Heading:* **1. Eclipse meteorology.**—*I.L.D.*

8.1–356 551.590.24:621.396.11

Gopalrao, M. S. V. and Ramachandra Rao, B. (both, *Andhra Univ. Waltair*), **Effect of solar eclipse of 20th. June 1955 on long distance shortwave transmissions.** *Current Science*, Bangalore, 24(12):408, Dec. **1955.** fig., 3 refs. **DLC**—Signal strength data as obtained between 0700 and 1000 h and during night on 9.52 Mc/sec at Waltair (lat. 17°41′) by a Hallicrafters type 5x-42 receiver show some peculiarities when the records before, during and after the

eclipse were compared. Insignificant influence of the D region absorption on signal strength is shown and sudden fading during eclipse is discussed briefly. *Subject Headings:* **1. Eclipse effects on short wave transmission 2. Short wave radio transmission.**—*W.N.*

8.1–357 551.590.24

Šimaljak, J. and Milerová, A., **Niektore pozorovania počas zatmenia slnka v Bratislave dna 30. júna 1954.** [A few observations during the solar eclipse of June 30, 1954 in Bratislava.] *Meteorologické Zprávy*, Prague, 7(5):132–134, **1954.** 4 figs., photo. Russian and German summaries p. 132. **DLC**—Values of total light intensity, yellow, red and ultraviolet light intensity, temperature, cosmic radiation and radio reception during the solar eclipse of June 30, 1954 are graphically presented. All values show a marked decrease during the eclipse, except tropospheric radio reception which definitely improved, possibly as a result of a decrease in ionization intensity. *Subject Headings:* **1. Solar eclipse observations 2. Solar eclipse, June 1954 3. Bratislava, Czechoslovakia.**—*G.T.*

8.1–358 551.590.24

Skeib, G. (*ed.*), **Die Sonnenfinsternis am 30. Juni 1954. Ergebnisse der Messungen und Beobachtungen des Meteorologischen Hauptobservatoriums Potsdam.** [Solar eclipse of June 30, 1954. Results of measurements and observations at the Potsdam Meteorological Observatory.] *Germany. Deutsche Demokratische Republik. Meteorologischer und Hydrologischer Dienst, Veröffentlichungen*, No. 16, **1955.** 32 p. 11 figs., 2 tables, 14 refs., eqs. **DWB, DLC**—A collection of 4 articles dealing with the measurement of direct radiation, polarization, atmospherics, temperature and other meteorological elements. *Subject Headings:* **1. Solar eclipse, June 1954 2. Radiation 3. Sferics 4. Potsdam, Germany.**—*A.A.*

8.1–359 551.590.25:523.5

Bumba, V., (*Astrophys. Obs., Ondrejov*), **Long-enduring meteor trains, Pt. 1, Statistical results.** *Bulletin of the Astronomical Institutes of Czechoslovakia*, Prague, 4(6):147–158, **1953.** 11 figs., table, 11 refs., 2 eqs. Russian summary p. 157–158. **DLC**—Data taken from Olivier's catalog of long-enduring meteor trains (comprising over 1000 trains suitable for this study) are statistically analyzed. The diagrams presented show relationships between such factors as height and duration of trains, appearance and disappearance of the meteor producing the train, brightness and speed of the meteor, etc. Latitudinal, diurnal, annual and solar-cycle cariations of mean train duration are also graphically represented. *Subject Heading:* **1. Meteor trails.**—*G.T.*

8.1–360 523.5 551.590.25

Jacchia, Luigi G. (*Harvard College Obs.*), **Fragmentation as the cause of the faint-meteor anomaly.** (In: Kaiser, T. R. (*ed.*), **Meteors.** London, Pergamon Press, **1955.** p. 36–42. 3 figs., 2 tables, 4 refs., 4 eqs.) **DWB**—The observed decelerations and light curves of bright meteors are in good agreement with the simple ballistic theory, while fainter meteors photographed with the Super-Schmidt cameras in New Mexico show startling anomalies. In particular, the durations of faint meteors are shorter and the decelerations increase faster than predicted by the theory, when the mass is computed from the integration of the luminous-intensity curve, in the same fashion as for bright meteors. Extreme fragility and progressive fragmentation seem to account for these and other anomalies. The concept of pellet-like meteors must be replaced with that of a cluster of breaking fragments in the case of most smaller bodies. *Subject Headings:* **1. Meteor trails 2. Meteor velocities.**—*Author's abstract.*

8.1–361 551.590.25:621.396.9:551.594.12

Kaiser, T. R. (*Univ. of Manchester, Jodrell Bank Experimental Station*), **The incident flux of meteors and the total meteoric ionization.** (In: Kaiser, T. R. (*ed.*), **Meteors.** London, Pergamon Press, **1955.** p. 119–130. 4 figs., 4 refs., 48 eqs.) **DWB**—Theoretical formulas are derived which relate the rate of meteors observed on a radio-echo equipment to the incident meteor flux. In addition, the mean rate of production of ions (in cm^{-3} sec^{-1}) at any height is evaluated as a function of the incident flux. Experimental results are given for sporadic

neteors and for several of the major meteor showers. The meteoric contribution to the onospheric E region is discussed. *Subject Headings:* **1. Meteor echoes 2. Meteor ionization 3. Jodrell Bank, Manchester.**—*Author's abstract.*

8.1–362 551.590.25:551.594.12:539.1

Sida, D. W. (*Physics Dept., Univ. College, London*), **Atomic collisions in meteor trails.** In: Kaiser, T. R. (*ed.*), **Meteors.** London, Pergamon Press, **1955.** p. 26–28. 5 refs. eqs.) **OWB**—Two problems of meteor trails, the ionization of the meteor atoms and subsequent diffusion of the ions, are discussed in terms of the atomic theory of collisions at low energies. Calcium atoms are considered representing the meteor particles, and the cross section for momentum loss is calculated for direct impact with neon atoms by a statistical method. Further the diffusion coefficient for Ca^+ ions in atomic oxygen is considered and compared with radio-echo decay observations. *Subject Headings:* **1. Meteor ionization trails 2. Ion diffusion 3. Atomic physics.**—*Author's abstract.*

VISIBILITY

See also: **Ceiling/visibility met. equipment** (Sperry Gyroscope Co.), 8.1–90.

8.1–363 551.591:551.510.42 551.508.92

Clayton George D. and Giever, Paul M. (both, *U. S. Public Health Service, Detroit*), **Instrumental measurements of a visibility in air pollution studies.** *Analytical Chemistry*, Wash., D. C., 27(5):708–713, May **1955.** 9 figs., table, 4 refs. **DLC**—An instrument which measures transmittance (the transmissometer) was found to be a useful tool, in air pollution studies, for measuring visibility in an urban atmosphere. It was relatively free of operating difficulties, required little attention, and was sufficiently sensitive to measure instantaneous variations in visibility. In a study of the relationship among data obtained with the instrument, the soiling power of the atmosphere, and the mass weight of air-borne particulates, it was found that there was no correlation among these three different methods of measuring aerosols. Visibility measurement therefore cannot be used as an index of the soiling power of the atmosphere or the mass weight of the air-borne particulates. Rain removed from the atmosphere some aerosols which cause discoloration, while snow had no such effect. *Subject Headings:* **1. Visibility instruments 2. Horizontal visibility 3. Atmospheric pollution studies.** —*Authors' abstract.*

8.1–364 551.591:551.576.4:629.135

U. S. Weather Bureau, **Final approach visibility studies.** Project ANDB 4.14, Progress Report, Fiscal Year 1953, **1953.** 52 p. 18 figs. (incl. photos of instruments), 3 tables, 9 refs. **OWB**—Continuation of progress reported in 1952 report (*see* 4.6–234, June 1953 and 6.6–16, June 1955, *MAB*) is outlined, including additional data on transmissometer field tests, on cloud-base height measurements (every 12 sec), and on adaptation of a facsimile recorder to autographic recording of ceilometer indications. Numerous photographs of equipment and records illustrate developments. A beautiful illustration of cloud heights variations in a short distance (or time) is included. *Subject Headings:* **1. Aircraft landing aids 2. Visibility 3. Ceilometer observations 4. Transmissometers. I. Haynes, B. C.**—*M.R.*

8.1–365 551.591.1:535.7

Bouman, M. A. (*Res. Unit for Perception, Kampweg* 3, *Soesterberg, Netherlands*), **Absolute threshold conditions for visual perception.** *Optical Society of America, Journal*, 45(1):36–43, Jan. **1955.** 35 refs. **DLC**—A quantitative approach to an understanding of fluctuating phenomena encountered near the threshold of vision has involved an analysis of frequency of seeing curves. The results of various investigators are discussed with reference to the possibility of an explanation based exclusively on the statistical fluctuations in the stimulating energy. Psychological variability in the conditioning of the subject can account for controversial results. The integrative actions in the visual system measured with the aid of flashes containing two separate small and short stimuli—with variable time and distance apart from each other—were discussed. Various merits of such experiments are put forward. The

absolute threshold behavior with respect to dependences of threshold energy on duration, velocity of moving sources, length and width of line-shaped targets, diameter and size of circular and square targets, was confronted and found in agreement with the two quanta explanation. Objections and modifying suggestions of other investigators on the two quanta concept are discussed. It is concluded that experimental results deny the correctness of such objections or modifications. The brightness impression of the perceived flash under the various conditions decreases with increasing target-size or test area. Suggestions are made as to the mechanisms which account for this effect. Such mechanisms account for deviations from theory at the simultaneous occurrence of large and long test flashes. *Subject Headings:* **1. Visibility research 2. Physiological factors in visibility 3. Visibility of flashes.**—*Author's abstract.*

OPTICAL PHENOMENA

8.1–366 551.593.1

Abnormal refraction [in] Pacific Ocean, South China Sea, Caribbean Sea [and] South Atlantic Ocean. *Marine Observer*, 26(173):143–145, July **1956.** figs. **DLC** Aug. 4, 1955, 21°36′S, 141°29′W, moon greatly enlarged and rimmed with red. Sept. 12, 1955, 9°26′N, 109°39′E, moon seen as a double crescent. Descriptions are given of refraction of a ship in the Caribbean Sea and of cliffs of Lobos Islands. *Subject Heading:* **1. Refraction phenomena.**—*C.E.P.B.*

8.1–367 551.593.5

Iridescence [in] West Pacific Ocean. *Marine Observer*, 25(168):103–104, April **1955.** fig. **DLC**—On April 21, 1954, in 15°59′N, 135°38′E, arcs of red, blue and green light appeared in the western sky 30 min after sunset. No explanation is given. *Subject Headings:* **1. Luminescence 2. Western Pacific.**—*C.E.P.B.*

8.1–368 551.593.55

Purple light [in] Caribbean Sea. *Marine Observer*, 24(165):145–146, July **1954. DLC**—An unusual observation in July 13, 1953. The first purple light was seen from 1855 to 1905 SMT, 230 340°, altitude 25° (sunset 1844). The second purple light, less defined, appeared 1920–1925, at 10° descending to 5°. *Subject Headings:* **1. Twilight phenomena 2. Caribbean Sea.**—*C.E.P.B.*

8.1–369 551.593.63

Bayliss, J. M., **Optical phenomena observed at Seletar, Singapore on August 19, 1953.** *Meteorological Magazine*, London, 83(980):57 58, Feb. **1954.** fig. **DWB**—At 0845 local time, 22° halo, upper arc of contact, Parry arc, parhelic circle, 3 mock suns, oblique arcs through anthelion, and infralateral arc to 46° halo. *Subject Headings:* **1. Halo observations 2. Singapore.**—*C.E.P.B.*

8.1–370 551.593.63

Halo complex, March 2, 1954. *Meteorological Magazine*, London, 83(984):186–188, June **1954.** 2 figs. **DLC**—A brilliant display over Britain on March 2, 1954 included 5 mock suns, parhelic circle, 22° and 46° halos, arcs of contact and several arcs cutting the parhelic circle. Several of the phenomena seen are very rare. *Subject Heading:* **1. Halo observations.**—*C.E.P.B.*

8.1–371 551.593.63

Harrower, T. N. S. and Evans, D. C., **Paraselene observed at London Airport.** *Meteorological Magazine*, London, 83(984):184, June **1954.** fig. **DWB**—On March 20, 1954 in very tenuous CiSt at −50°C at 29,000 ft. No 22° halo. *Subject Heading:* **1. Paraselene.**—*C.E.P.B.*

8.1–372 551.593.63

Lunar halo [in] South Pacific Ocean [and in] Bay of Bengal. *Marine Observer*, 24(165): 43, July **1954.** fig. **DLC**—1. Halo of 30° radius seen in 33°40′S, 167°24′W on July 19, 1953, ossibly Scheiner's (28°) or Feuillée's (32°). 2. 21° halo with two intersecting arcs, not ncluded in recognized halo phenomena. *Subject Heading:* **1. Halo observations.**—*C.E.P.B.*

8.1–373 551.593.63

Rare lunar halo phenomena [in] North Atlantic Ocean. *Marine Observer*, 22(158):196–97, Oct. **1952.** 2 figs. **DLC**—Descriptions include: 1. tangent arc above and intersecting rc below 22° halo, neither symmetrical about vertical (fig.) 2. halo of 26° radius 3. halo of 8° radius and intersecting arc (fig.). *Subject Headings:* **1. Halo observations 2. North tlantic.**—*C.E.P.B.*

8.1–374 551.593.63

Venkateswara Rao, D. and Banerjee, R. C. (both, *Regional Met. Center, Calcutta*), **An nusual parhelion at Calcutta.** *Indian Journal of Meteorology and Geophysics*, Delhi, 5(4):358–62, Oct. **1954.** fig., 2 tables, 5 refs., 5 eqs. **DLC**—The meteorological conditions leading o the appearance of parhelion at Calcutta, accompanied by a partial halo have been investiated. From the angular elevation of the sun, the distances from the sun of the parhelion nd the partial halo at the times of their appearance and disappearance have been computed. he study leads to the inference that incipient cirrus is mainly composed of hexagonal ice rystals with their sides vertical in a field of light to moderate winds. The distribution of such rystals is orderly and the deviation of light through them is a minimum. *Subject Headings:* **. Halo observations 2. Calcutta, India.**—*Authors' abstract.*

8.1–375 551.593.9

Unidentified phenomenon [in] North Atlantic Ocean. *Marine Observer*, 26(173):147, uly **1956.** fig. **DLC**—Sept. 13, 1955, in 33°20′N, 32°18′W, brilliant coloration was observed n a light rain shower. *Subject Headings:* **1. Optical phenomena 2. North Atlantic.**—*C.E.P.B.*

ELECTRICAL PHENOMENA

See also: **Meteor ionization** (Dubin), 8.1–180; **Incident flux of meteors** (Kaiser), 8.1–361; **Atomic collisions in meteor trails** (Sida), 8.1–362; special bibliography on **Solar relations with weather**, p. 95.

8.1–376 551.594.1/2

Uchikawa, K. (*Memambetsu Magnetic Obs.*) and Kondo, G. (*Honjo Aerological Obs.*), **Measurements of the atmospheric electricity with captive balloon.** *Meteorological Society of Japan, Journal*, Ser. 2, 33(3):124–132, July **1955.** 10 figs., table, 7 refs., 21 eqs. English nd Japanese summaries p. 124. **DWB, DLC**—Measurements of the electrical current in the nooring wire of the captive balloon and of the electrical conductivity in the lower atmosphere ere carried out from Jan. to Oct., 1953 at Honjo, Saitama Prefecture. We observed these wo elements on fair weather nights. The meteorological phenomena on calm days have been onsidered to have smaller influence on atmospheric electricity. But from our results, it is onsidered that the potential gradient at the ground surface is remarkably affected by meteorogical phenomena—nocturnal inversions—on calm nights. *Subject Headings:* **1. Atmospheric lectricity measurement 2. Captive balloons 3. Honjo, Japan.**—*Authors' abstract.*

8.1–377 551.594.11:551.590.24:551.508.94

*Koenigsfeld, L. (*Inst. Royal Météorologique, Uccle*), **Investigations of the potential gradient t the earth's ground surface and within the free atmosphere.** (In: **Thunderstorm electricity.** Chicago, Univ. of Chicago Press, **1953.** p. 24–45. 9 figs., 9 plates, 2 refs.) **DWB**—Results btained with an electronic portable electrometer (KOENIGSFELD and PIRAUX) attached to a adiosonde, since 1950 at Uccle, and ground measurements during solar eclipse of Feb. 25, 952, in Leopoldville, Belgian Congo, are summarized and equipment and records illustrated.

Mean hourly potential gradient at Libenge and Leopoldville, Belgian Congo, is shown on graphs. Variation during eclipse is also shown and 9 radiosondes at Libenge reproduced *Subject Headings:* **1. Electrometers 2. Potential gradient 3. Solar eclipse, Feb. 1952 4. Leo poldville, Belgian Congo 5. Libenge, Belgian Congo.**—*M.R.*

8.1–378 551.594.12:551.57

Arabadzhi, V. I., **Ob elektrizatsii chastits v oblakakh.** [Electrification of particles i clouds.] *Meteorologiia i Gidrologiia*, Leningrad, No. 6:37, Nov./Dec. **1955.** 3 refs., 3 eqs **DWB, DLC**—A formula for calculating the charge formed on colliding water droplets o different potential is presented and it is concluded that the electrification of purely aqueou clouds may be attributed to the contact of different potentials arising during the collisions o drops of different dispersions. The production of thunderstorm activity in the presence o positive temperature by the electrification mechanism and electrification of clouds above th freezing level are discussed. *Subject Headings:* **1. Electrification of clouds 2. Thunderstorn formation.**—*I.L.D.*

8.1–379 551.594.12:551.510.53

Jackson, John E. (*U. S. Naval Res. Lab., Wash., D. C.*), **A new method for obtainin electron-density profiles from P′-f records.** *Journal of Geophysical Research*, Wash., D. C 61(1):107–127, March **1956.** 17 figs., 11 refs., 14 eqs. **DLC**—A practical and accurat method for reducing P′-f records to electron densities *vs* true height is described and used t analyze P′-f records taken at White Sands. Direct measurements of electron densities in th ionosphere obtained with the aid of rockets are used to check the method. Results obtaine by these two independent techniques are shown to be in excellent agreement. Twenty P′- records were reduced for the period from 1948 to 1954, all of which reveal a considerable degre of regularity in the height of the daytime E1 and F2 regions. Some of the profiles obtaine are shown. One of the illustrations shows a one-hour sequence, where the F2 virtual heigh varied from 650 km to 410 km, whereas the true height remained essentially unchanged *Subject Headings:* **1. Ionospheric height determination 2. Ionospheric electron density com putation.**—*Author's abstract.*

8.1–380 551.594.13:551.510.53

Maeda, Hiroshi (*Geoph. Inst., Kyoto Univ.*), **The vertical distribution of electrical con ductivity in the upper atmosphere.** *Journal of Geomagnetism and Geoelectricity*, Kyoto 5(3):94–104, Nov. **1953.** 6 figs., 2 tables, 16 refs., 51 eqs. **DLC**—Using available material of recent rocket measurements, a calculation is made to obtain the atmospheric and ionospheri models of the upper atmosphere between 60 km and 400 km. On the basis of these models th vertical distribution of electrical conductivity and its height-integrated values for thre ionospheric regions F, E and D are obtained. The results show that the conductivity of th E region, especially near 100 km, is most predominant, so that this region is most probabl affected by the electrical currents producing daily magnetic variations. *Subject Headings* **1. Vertical distribution of electrical conductivity 2. Electrical conductivity measurement 3. Ionospheric layers.**—*Author's abstract.*

8.1–381 551.594.14:662.6

Anderson, W. and Turner, R. C., **Radon content of the atmosphere.** *Nature*, Londor 178(4526):203–204, July 28, **1956.** table, ref. **DWB**—Radium content of coal in Britai lies between 0.5 and 3.25×10^{-3} gm/gm coal, and is not a significant source of atmospheri radon. The enhanced radioactivity during smoky fog is attributed to accumulation of daughte products of radon in special meteorological conditions. *Subject Headings:* **1. Radioactivity o the atmosphere 2. Radium content of coal.**—*C.E.P.B.*

8.1–382 551.594.1

Goldberg, Paul G.; Parziale, A. J.; Faucher, Gerard; Manning, Bernard and Lettau Heinz, **Silver iodide diffusion experiments conducted at Camp Wellfleet, Mass., during July Aug. 1952.** *U. S. Air Force. Cambridge Research Center, Air Force Surveys in Geophysics*

No. 44, June 1953. 26 p. figs., charts, tables, foot-refs., eqs. **DLC**—This report contains four studies dealing with the feasibility of utilizing air-borne equipment for detecting atmospheric conductivity to track radioactive smoke clouds emanating from ground generators and determining "operational requirements and procedures utilizing a two-curve radioactive source" (AgI^{131}) for scaling these factors in terms of a higher level radioactivity experiment (P. G. Goldberg); silver iodide diffusion experiments for the purpose of determining AgI particle trajectory, the efficiency of dispersing these particles in a free atmosphere (G. Faucher and A. J. Parziale); description of a method of producing AgI aerosols using very small amounts of radioactive AgI (Bernard Manning); and an evaluation of the experiments and results of the above experiments (Henry Lettau). *Subject Headings:* **1. Silver iodide diffusion 2. Silver iodide smoke generators 3. Radioactive aerosols 4. Camp Wellfleet, Mass.**—*I.L.D.*

8.1–383 551.594.14:551.574.1:662.2:539.1

Greenfield, S. M. (*Rand Corp., Santa Monica, Calif.*), **Ionization of radioactive particles in the free air.** *Journal of Geophysical Research*, Wash., D. C., 61(1):27–33, March **1956.** refs., 9 eqs. **DLC**—In order to evaluate the possible role of radioactive particles from an atomic cloud as condensation nuclei, an analysis has been made to determine their degree of ionization. Individual radioactive particles become ionized due to β emission, and an estimate of the half-life of these ions has been made for various times in the life history of an atomic cloud. It is concluded that while there is a transient charge on these particles, its half-life is small compared to the disintegration rate, with the result that for all practical purposes radioactive particles in the free air are not necessarily preferred condensation nuclei. *Subject Headings:* **1. Radioactive condensation nuclei 2. Atomic explosion effects.**—*Author's abstract.*

8.1–384 551.594.221:551.577

Balasubramanian, C. (*Agr. Res. Inst., Coimbatore*), **Correlation between lightning and rainfall at Coimbatore.** *Indian Journal of Meteorology and Geophysics*, Delhi, 6(1):82, Jan. **1955. DWB, DLC**—The number of lightning flashes in Sept. was found to be correlated significantly with the rainfall in Nov. ($r=0.4151\pm0.1496$). Also the number of lightning flashes and total rainfall in Oct. and Nov. are positively correlated. This relationship between the persistence of the northeast monsoon in Nov. and the frequency of lightnings in Sept. is considered worthy of further study. *Subject Headings:* **1. Lightning-rainfall relationships Coimbatore, India.**—*I.L.D.*

8.1–385 551.594.21 551.594.221 551.508.94

†Malan, D. J. and Schonland, B. F. J. (*Bernard Price Inst. for Geophysical Res., Johannesburg*), **Charge distribution and electrical processes deduced from lightning measurements.** In: **Thunderstorm electricity.** Chic., Univ. of Chic. Press, **1953.** p. 238–250. 4 figs., refs. 249–250.) **DWB**—A review of work in South Africa by the authors on charge distribution in thunderclouds and lightning since 1939. Results of comparison of luminous effects and electric field changes from near flashes to ground, development in recording equipment, studies with the electrostatic flux meter, the negative column, the nature of the junction process and evidence of charge generating mechanism in clouds. In the latter connection it was found that the maximum height of the negative column is about 10.4 km or near the −40°C isotherm where spontaneous freezing and accompanying change in charge is thought to take place. *Subject Headings:* **1. Thundercloud charge distribution 2. Thunderstorm electricity Lightning charges 4. South Africa.**—*M.R.*

8.1–386 551.594.222:551.594.11:551.535

Chalmers, J. A. and Kirkman, J. R., **Relation between point discharge current, potential gradient and wind speed for an isolated point: preliminary report.** Durham. Univ., Contract AF 61(514)-743-C, Technical Note, No. 1, Oct. 1–June 30, **1955.** unpaged. 2 figs., photo., refs., 3 eqs. **DWB**—Measurements have been made of the current through a point at a height of 27 m, the potential gradient at a point 45 m to windward and the wind speed. For negative potential gradients, the results fit a formula: $I=K(F-M)\ (W+C)$ where I is the

current, F the potential gradient and W the wind-speed, K, M and C being constants. If I is in μA, F in V/m and W in m/sec, K is approximately 3.6×10^{-4}, M 150 V/m and C 3.72 m/sec. The results are discussed in relation to theoretical work by CHALMERS and MAPLESON (1955). (*See* 6.6·333, June 1955, *MAB.*) *Subject Headings:* **1. Point discharges 2. Potential gradient variations 3. Wind speed effects.**—*Authors' abstract.*

AURORAS

See also: **Auroral Obs., Tromsö** (Norske Inst.), 8.1–114.

8.1–387 551.594.51:535.33

Fan, C. Y. (*Yerkes Obs., Williams Bay, Wisc.*), **Is helium a component of auroral particles?** *Astrophysical Journal*, Chicago, 122(2):350–351, Sept. **1955.** fig., 3 refs. **DLC**—Failure to observe Doppler-shifted He lines in early laboratory experiments by FAN and MEINEL (1953 and 1954), using high energy protons (He^+ and Ne^+ ions) in air at 10^{-1} mm pressure, is attributed to such high pressures used to avoid long exposure time. At 10^{-1} mm Hg it was found the lifetime of the first bound electron of an He atom was only 10^{-1} sec and hence the He atom would have lost its electron before the optical transition could occur. By reducing the pressure to 10^{-3} and 10^{-4} the Doppler-shifted He lines at 5876 and 6678Å were clearly visible (as a double line at 10^{-4} mm but not so clear at 10^{-3} mm). In the actual aurora no such lines have been detected, but interference from the strong 6705Å band of the first N_2^+ system would account for failure. The λ5876 should be detectable if auroral particles are composed of 5% or more He particles. High dispersion spectra of quiet arcs are needed to decide whether the lines are really there or have merely been masked by other lines. *Subject Headings:* **1. Auroral spectra 2. Helium in auroral particles 3. Doppler displacement of He lines. I. Meinel, A. B.**—*M.R.*

8.1–388 551.594.5:537.525

Block, L. (*Royal Inst. of Tech., Stockholm*), **On the scale of auroral model experiments.** *Tellus*, Stockholm, 8(2):234–238, May **1956.** 2 figs., 9 refs., 17 eqs. **DLC**—The possibilities to scale down the physical properties of gaseous discharges with altered linear dimensions are considered with special regard to model experiments on auroras. It is shown that the drift orbits can be transformed correctly, although the spiralling motion around the magnetic field lines cannot. This spiralling motion constitutes a very small ripple on the drift orbits in nature but a greater ripple in the experiments. However, this ripple seems to be of minor importance, and reasons are given for the view that the recent auroral experiments represent nature in a satisfactory way. *Subject Headings:* **1. Auroral model experiments 2. Electrical discharges in gases.**—*Author's abstract.*

SFERICS

See also: **Annual sferics variations** (Reiter), 8.1–122.

8.1–389 551.594.6:551.515.8

Kimpara, Atsushi (*Nagoya Univ.*), **Atmospherics due to fronts in the upper atmosphere.** *Journal of Geomagnetism and Geoelectricity*, Kyoto, 5(1/2):8–13, June **1953.** 6 figs., table, 4 refs. **DLC**—For a long time a distinctive zonal distribution of atmospherics has been observed over the Pacific Ocean in lat. 30° to 40°N all the year round, especially in autumn and winter. Although they are not so strong as those from southern districts, they are often found even in the interior of Asia at night and have a fairly narrow zonal distribution. Abundant meteorological information on the upper atmosphere, furnished by airplane observations and radio soundings in the neighborhood of Japan, show that they are generated in the convergence region of fronts in the upper atmosphere such as polar fronts. By extending this idea to the middle of the Pacific as well as to the interior of Asia, where no reliable information is obtainable, we could explain with ease the zonal distribution of atmospherics in lat. 30° to 40°N and long. 80° to 180°E. *Subject Headings:* **1. Zonal distribution of sferics 2. Frontal origin of sferics.**—*Author's abstract.*

8.1–390 551.594.6:523.75

Křivský, L. (*Astrophys. Obs. Ondrejov*), **Äusserung der chromosphärischen Eruptionen in den atmosphärischen Störungen.** [Manifestation of chromospheric eruptions in atmospheric disturbances.] *Bulletin of the Astronomical Institutes of Czechoslovakia*, Prague, 4(6):196, 1953. tables. **DLC** Correlations between chromospheric eruptions of importance 1, 2 and 3, and sferics on 11 km wavelength were statistically analyzed for the period July 1951–Sept. 1952. General results of the analysis are tabulated and briefly commented on. *Subject Heading:* **1. Sferics 2. Chromospheric eruptions.**—*G.T.*

8.1–391 551.594.6:551.590.24

Skeib, G., **Der Einfluss der Sonnenfinsternis auf die Ausbreitung atmosphärischer Störungen im Bereich von 5 kHz bis 30 kHz.** [Effect of solar eclipse upon the propagation of atmospheric disturbances in the region of 5 kHz to 30 kHz.] *Germany. Deutsche Demokratische Republik. Meteorologischer und Hydrologischer Dienst, Veröffentlichungen*, No. 16:24–27, **1955.** 2 figs. **DWB, DLC**—Effect of eclipse noticed in positive deviation of the number of atmospherics on 30 kHz with a lag of 15 min and a very sharply pronounced 100% deviation in the 5 kHz field strength of atmospherics. The latter is difficult to explain, since an opposite effect was expected. No effect was observed in the number of atmospherics on 10 kHz. *Subject Headings:* **1. Sferics 2. Eclipse effects 3. Potsdam, Germany.**—*A.A.*

8.1–392 551.594.6:551.501.9

Weil, Joseph; Newman, M. M. and Stakmann, J. R., **Correlation of thunderstorm atmospheric measurements.** (In: Conference on Radio Meteorology, Nov. 9–12, 1953, Univ. of Texas, **Supplement to the Proceedings.** V. 2, pub. **1954.** 11 p. 6 figs. [incl. photos].) **DWB**—A joint program has been planned for correlating waveshape lightning sferics measurements made at Socorro, N. Mex., Minneapolis, Minn. and Gainesville, Fla., by the respective laboratories using oscillographs. Frequency, duration, spacing, shape and polarity of impulses are considered. Synchronization (timing by telephone or radio) for 3 stations in the triangle presents problems whose solution is suggested. Photographing the screen, crystal clock and receiver output simultaneously is one method of assuring synchronized results. Line delay between stations can be corrected by known procedures. *Subject Headings:* **1. Sferics networks 2. Sferics recording correlation 3. Minneapolis-Socorro-Gainesville triangle.**—*M.R.*

RADIO METEOROLOGY

8.1–393 551.594.7:621.396.8

Anderson, L. J. and Gossard, E. E., **Prediction of oceanic duct propagation from climatological data.** *Institute of Radio Engineers, N. Y., Professional Group on Antennas and Propagation, Transactions*, Vol. AP-3, No. 4:163–167, Oct. **1955.** 5 figs., foot-refs. **DLC.** Also issued as: *U. S. Navy Electronics Laboratory, San Diego, Calif., Research and Development Report*, No. 654, Dec. 14, **1955. DWB**—Techniques are described for predicting the effect of the "oceanic duct" in increasing the coverage of low-sited microwave radars. Prediction is made on a monthly basis using statistical data on sea temperature, air temperature, humidity, and wind speed. A large area in the northwest Pacific is used to illustrate the methods used. The basic prediction approach is to deduce refractive index profiles from available data parameters and to use SCHELKUNOFF's ducting criteria to predict radar propagation effects. Monthly contours are then drawn over the area for each radar band showing the probability of extended coverage. *Subject Headings:* **1. Radio transmission duct prediction 2. Radio climatology.**—*Authors' abstract.*

8.1–394 551.594.7:551.510.535

Chvojkova, E. (*Astron. Inst. Ondrejov*), **Über den Weltumlauf der Radiostrahlen (Refraktion der Kurzwellen in nichtparabolischer Schicht).** [Radio propagation around the globe: short wave refraction in a nonparabolic layer.] *Bulletin of the Astronomical Institutes of Czechoslovakia*, Prague, 5(5,6):104–108, 110–111, **1954.** 5 figs., 4 refs., 7 eqs. Russian summary p. 111. **DLC**—Investigators of properties of ionospheric layers usually have a

preference for assuming a parabolic layer. In this paper a new type of layer is introduced, very similar to the Chapman layer. This new model makes it possible to analyze the properties of a spherical layer in whose lower boundary the electron density reaches the zero value gradually rather than abruptly. It appears that not only in the middle but also in the lower boundary region of a nonparabolic layer there is a narrow range within which a horizontally propagating wave is forced into a circumglobal course as far as the structure of the layer remains unchanged. *Subject Headings:* **1. Radio wave propagation 2. Ionosphere models.**—*Trans. of author's abstract.*

8.1–395 551.594.7:621.396

Shmoys, J. (*Dept. Elec. Engr., Polytechnic Inst. of Brooklyn, Brooklyn, N. Y.*), **Long-range propagation of low-frequency radio waves between the earth and the ionosphere.** *Institute of Radio Engineers, N. Y., Proceedings*, 44(2):163–170, Feb. **1956.** 4 figs., 15 refs., 77 eqs. **DLC**—The problem of modes of propagation of electromagnetic waves between a perfectly conducting earth and a gradually varying ionosphere is considered. The case of exponentially varying ionospheric parameters is solved in terms of Bessel functions. The propagation constant, the angle of arrival and the group velocity are calculated for the first few modes of propagation. It is shown that the results for the phase and group velocities and angle of arrival of low-order modes obtained when the ionosphere is assumed to be a perfectly conducting sheet at a height simply related to ionospheric parameters are very close to the true values. An application of this theory to the propagation of "tweeks" is discussed. *Subject Headings:* **1. Radio wave propagation 2. Electromagnetic waves.**—*Author's abstract.*

8.1–396 551.594.7:621.396.11:629.13

Starkey, B. J., **Some aircraft measurements of beyond-the-horizon propagation phenomena at 91.3 Mc/s.** *Farnborough, England. Royal Aircraft Establishment, Technical Note*, No: RAD.638, March **1956.** 4 p. 4 figs., 7 refs. Mimeo. **GB-MO**—Also in: *Institution of Electrical Engineers, Proceedings*, Pt. B, 103(12):761–763, Nov. **1956.** 4 figs., 8 refs., eq. **DLC**—Field strength measurements on an aircraft at 10,000 ft 150–430 mi from source (Wrotham) showed an initial decrease slower than expected from diffraction theory, maxima at about 250 and 300 mi, deep and regular fades beyond 350 mi and a rapid drop to noise level at 420 mi. Horizon was about 175 mi. The extended range is attributed to specular reflection from a tropopause discontinuity of refractive index at 38,000 ft shown by radiosonde at Lerwick. The fluctuations are explained by interference between various rays. *Subject Heading:* **1. Anomalous radio propagation.**—*C.E.P.B.*

8.1–397 551.594.7:551.515:621.396.24

Lauter, E. A. and Klinker, L. (*Met. Obs., Kühlungsborn*), **Der Einfluss der Wetterlagen auf die Erscheinungsformen des UKW-Fernenpfanges.** [Influence of weather conditions on the characteristics of long-distance ultra-short wave reception.] *Zeitschrift für Meteorologie*, 8(7/8):222–230, July/Aug. **1954.** 7 figs., table, 9 refs. **DWB**—Field intensity recordings in the ultra short wave range over land and water are examined with reference to the effect of the weather situation upon the appearance of stable and labile forms of reception. In agreement with prevailing conceptions of the different ultra short wave propagation mechanisms, stable reception forms with relative high field intensities predominate during anticyclonic weather while the scattering phenomena with low field intensities predominate during cyclonic weather. Variations in the structure of the lower layer of the atmosphere produce seasonal differences in the frequency of the individual reception forms and field intensities over land and water. *Subject Heading:* **1. Radio meteorology.**—*Trans. of authors' abstract.*

PART II. ANNOTATED BIBLIOGRAPHY ON SOLAR RELATIONS WITH WEATHER

By: *C. E. P. Brooks*

INTRODUCTION

Bjorn Helland-Hansen and Fridthof Nansen, in Ch. X of their great work on **Temperature variations in the North Atlantic Ocean and in the atmosphere,** published in German at Oslo in 1917 and in English by the Smithsonian Institution in 1920 (*see* 8A–1), review the literature of the relations between solar and meteorological phenomena from the commencement of work on the subject until 1914. A separate paragraph is allocated to each of the more important works, and the whole summary is very thorough, occupying 41 pages.

About 1925 the author was asked by the Commission appointed to further the study of Solar and Terrestrial Relationships to continue this summary along the same lines. The result was included in the First Report of the Commission, and includes the literature from 1914 to 1924 inclusive (*see* 8A–4). Very little matter of importance was omitted from these two compilations, and it seemed unnecessary to cover the same ground in the present instance. This bibliography may therefore be regarded as a further continuation, covering the period from 1924 or 1925 to date. Reports were made to the Commission subsequently at intervals of a few years, and these have been included in the following bibliography.

The subject matter is limited to works dealing wholly or in part with the effect of solar radiations on weather at the earth's surface. It is divided into five sections according to the elements dealt with:

1. General
2. Temperature
3. Pressure, storminess and winds
4. Rainfall, river and lake levels
5. Cloud, thunderstorms and atmospheric electricity

OUTLINE OF CONTENTS

SUBJECT OUTLINE

General
Bibliographies, 8A–1, –4
Monographs, 8A–5, –14, –26, –60, –117
Symposia, 8A–27
Textbooks, 8A–106
Elements Affected by Solar Phenomena
Atmospheric circulation, 8A–7, –21, –28, –43, –62, –67, –75, –77, –81 to –83, –106, –109, –113, 117
Disturbances, 8A–71
Air masses, 8A–21
Cyclones, 8A–63, –68
Hurricanes, 8A–73
Thunderstorms, 8A–15, –32, –78, –100, –102, –105
Radiation
Albedo of Jupiter, 8A–41
Cosmic radiation, 8A–27
Sky radiation, 8A–26
Solar constant, 8A–14, 8A–73
Solar radiation, 8A–16, –24, –36, –45
Night sky light, 8A–27
Terrestrial radiation, 8A–26
Ultraviolet radiation, 8A–18, –35, –37
Temperature, 8A–16, –20, –25, –33, –106, –107, –115
Cold winters, 8A–37
Hot summers, 8A–37
Sea temperatures, 8A–1
Temperature periodicities, 8A–51, –57, –58, –109
Temperature variations, 8A–1, –18, –22, –38, –52, –54, –55, –59, –107
Upper air temperature, 8A–56
Pressure, 8A–16, –21, –30, –33, –35, –53, –60, –61, –65, –66, –69, –72, –74, –76, –78, –79, –84
Wind
Etesian wind, 8A–70
Evaporation, 8A–85
Condensation, 8A–103
Cloud, 8A–18
Precipitation, 8A–33, –114, –115
Annual precipitation, 8A–53, –89
Precipitation variations, 8A–13, –87, –88, –93, –96, –97, –108
Lake level variations, 8A–90

Miscellaneous
Atmospheric electricity, 8A–18
Auroras, 8A–20, –23, –27
Earthquakes, 8A–10
Geomagnetic activity, 8A–20, –35, –84, –103
Halos, 8A–21, –101, –103, –104
Ionization, 8A–27
Microseisms, 8A–71
Potential gradient, 8A–2, –98, –99
Radio reception, 8A–20
Refractive index, 8A–64
Twilight phenomena, 8A–27
Zodiacal light, 8A–27
PERIODICITIES, 8A–2, –7 to –9, –14, –18, –24, –29, –91
27 day, 8A–24, –52, –66, –77
4.8 month, 8A–19
7.2 month, 8A–19
11 month, 8A–16
12 month, 8A–19
3 year, 8A–10
5 year, 8A–56
5.6 year, 8A–77
6 year, 8A–10
11 year, 8A–3, –10, –12, –23, –28, –38, –44, –63, –102
12 year, 8A–16
17 year, 8A–10
22 year, 8A–62, –86, –87, –89
23 year, 8A–14, –25, –64
30 year, 8A–10
36 year, 8A–3
55.6 year, 8A–100
80 year, 8A–50, –107
80–90 year, 8A–38
APPLICATIONS
Forecasting
Airways forecasting, 8A–80
Long range forecasting, 8A–14, –16, –22, –24, –25, –30, –31, –49, –57, –65, –81, –91, –117
Precipitation forecasting, 8A–93
Upper air wind forecasting, 8A–80
Analysis of climatic change, 8A–8, –15, –34, –48, –50, –53, –75
Chinese earthquakes, 8A–12
Nile floods, 8A–12
Severe winters, 8A–12, –22
Tree growth, 8A–12, –21

GEOGRAPHICAL OUTLINE

ARCTIC
Soviet Arctic, 8A–28
NORTHERN HEMISPHERE, 8A–113
NORTH AMERICA
Canada, 8A–18
United States, 8A–46, –49, –59, –68, –94
Illinois
Peoria, 8A–91
New York
Albany, 8A–92
New York, 8A–95
Oklahoma, 8A–89
Texas, 8A–89
Washington, D. C., 8A–24, –57
EUROPE, 8A–59, –78, –82
Central Europe, 8A–58
Czechoslovakia
Prague, 8A–93
England
Kew, 8A–2
Germany, 8A–13, –78, –81
Greece, 8A–70
Hungary
Budapest, 8A–107, –108
Mediterranean Region, 8A–96
Norway, 8A–51, –79
Oslo, 8A–52
Scandinavia, 8A–35
Switzerland
Zurich, 8A–114
AFRICA
Central Africa
Lake Victoria, 8A–85, –90
AUSTRALASIA
Australia, 8A–59, –88
Indonesia, 8A–72
Java, 8A–56
OCEANS, SEAS AND ISLANDS
Atlantic Ocean
North Atlantic, 8A–1, –62

1. GENERAL

1920

8A–1 551.590.21 551.524.33 551.526.6(261)

*†Helland-Hansen, Bjorn and Nansen, Fridthof, **Temperature variations in the North Atlantic Ocean and in the atmosphere. Introductory studies on the cause of climatological variations.** *Smithsonian Miscellaneous Collections*, 70(4), **1920.** 408 p. 113 figs., 48 plates, 21 tables, 149 refs. **DLC**—This great compilation discusses first the surface temperature distribution and variations over the Atlantic, and the interactions between temperature, pressure and winds. On p. 130–146 the periodicities in temperature are examined and are related to variations of sunspots and protuberances. The obvious similarity led to a thorough research (p. 146–187) into the literature of solar and terrestrial relations, covering temperature, air pressure, wind, precipitation, height of water in lakes and rivers, growth of trees, cloudiness, dust, theoretical relations and storminess,

covering the period 1826 to 1914 and a few later papers. In view of the excellent summaries included in this chapter, these papers have not been abstracted here. The authors then continue with their own researches, discussing a number of problems and inconsistencies in the relations and theories. An Appendix I (p. 307–333) gives annual temperature departures for 47 inland stations, 1875–1910, and tables on p. 340–408 give many data of sea and air temperature, pressure, etc. for the North Atlantic and neighboring regions. The bibliography was continued by C. E. P. Brooks in the first report of the Commission (*see* 8A–4) appointed to further the study of solar and terrestrial relationships. *Subject Headings:* **1. Solar influences 2. Temperature variations 3. Sea temperatures 4. North Atlantic.**

1924–1928

8A–2 551.590.21:519.241.1

*Chree, C., **Periodicities, solar and meteorological.** *Royal Meteorological Society, Quarterly Journal,* 50(210):87–97, April **1924.** fig., 5 tables. **DWB**—Annual values of sunspots, and of rain, temperature and daily range, sunshine, cloud, potential gradient and magnetic range at Kew, Eng., are tabulated, 1856–1921. Correlation and regression coefficients are given between sunspots and all these elements, for 3 or 4 separate periods. Some large individual coefficients are found, but when these are combined for the whole period, they are negligible except for potential gradient. The same result follows from consideration of values of the elements in years of sunspot maximum and minimum, and of mean sunspot frequency in years of maxima and minima of the element. *Subject Headings:* **1. Solar influences 2. Correlation theory 3. Kew, Eng.**

8A–3 551.590.21:551.583.13

Clough, H. W., **A systematically varying period with an average length of 28 months in weather and solar phenomena.** *Monthly Weather Review,* 52:421–441, **1924. DWB**—The 2–3 year "periodicity" in sunspots, pressure and temperature is examined in temperature (1730–1924) and pressure (1743–1924) series in Europe, temperature from 1780 in U. S. and sunspots from 1750, and found to average 2.33 years, but increasing in length and decreasing in amplitude from north to south, and to vary from $1\frac{1}{2}$ to $3\frac{1}{2}$ years according to its position in the 11-year and 36-year cycles. *Subject Headings:* **1. Solar influences 2. Periodicities.**

8A–4 551.590.21:061.3

†Brooks, C. E. P., **The relations of solar and meteorological phenomena: a summary of the literature from 1914 to 1924 inclusive, being a continuation of the summary published as Ch. X of "Temperature variations in the North Atlantic Ocean and in the atmosphere" by Bjorn Helland-Hansen and Fridthof Nansen.** *International Council of Scientific Unions, Brussels, First Report of the Commission for the Study of Solar and Terrestrial Relationships,* pub. Paris, **1926.** p. 66–100 (English) and p. 163–200 (French). 100 refs. **DLC**—This exhaustive digest gives separate abstracts of 100 papers, classified under: temperature (p. 69–75), pressure (p. 75–83), wind (p. 83), rainfall, tree-growth and lake levels (p. 83–89), harvest cycles, fluctuations of animals (p. 89), cloudiness (p. 89–90), the sun and atmospheric electricity (p. 90) and theoretical relationships (p. 90–94). (For an abstract of Helland-Hansen and Nansen, *see* 8A–1.) *Subject Headings:* **1. Solar influences 2. International Commission on Solar-Terrestrial Relationships.**

8A–5 551.590.21:061.3

International Council of Scientific Unions, (International Research Council), **First Report of the Commission Appointed to Further the Study of Solar and Terrestrial Relationships.** pub. Paris, **1926.** 202 p. in English and French. **DLC**—This report includes a short introductory memorandum by C. G. Abbot: **Notes on the relationship between solar and terrestrial phenomena** (p. 15–16, 111–112), a **Note on the relations between solar, meteorological, oceanographical and wireless phenomena** by E. Delcambre (p. 37–40, 134–137) and **Report on the relations between the sun and the earth** by H. Deslandres (p. 41–45, 138–142) pointing out the necessity for systematic coordinated observations, including upper air; various other papers on geophysical or astrophysical subjects. Also a long digest by C. E. P. Brooks (p. 66–100, 163–200; (*see* 8A–4)), abstracted separately. *Subject Headings:* **1. Solar influences 2. International Commission on Solar-Terrestrial Relationships.**

8A–6 551.583.13:523.746

Brooks, C. E. P., **Non-linear relations with sunspots.** *Royal Meteorological Society, Quarterly Journal,* 53(221):68–71, Jan. **1927.** 2 figs., 5 tables, 4 refs. **DWB**—It is shown that correlations between sunspot relative numbers and some meteorological series are improved if the square root of the sunspot number is used. This applies to tropical temperatures (Köppen), levels of Lake Victoria, Siberian thunderstorms (Septer) and Bathurst (Gambia) rainfall. For Siberian thunder-

storms the coefficient is improved from 0.88 to 0.92. According to A. ÅNGSTRÖM the solar constant C is related to the sunspot number S by $C = 1.903 + 0.011\sqrt{S} - 0.0006\,S$. For thunderstorms the relation is $7.2 + 1.36\sqrt{S} - .012\,S$. *Subject Heading:* **1. Sunspot effects.**

8A–7 551.583.13:551.513.7:523.746

Shostakovich (Schostakowitsch), Vladimir B., **Beziehungen von Luftdruck, Temperatur, Niederschlag zu Sonnenflecken, sowie Einfluss der Vulkanausbrüche auf die Klimaelemente.** [Relations of pressure, temperature, precipitation to sunspots, and influence of volcanic outbreaks on climatic elements.] *Meteorologische Zeitschrift*, 45(9):326–334, Sept. **1928.** fig., 3 tables. **DLC**—A world map shows the boundaries of the regions where the variations of pressure and precipitation are opposed to, and of temperature are parallel to, the sunspot curve. Opposition between pressure and sunspots covers two separate areas: Africa to Australia, and the northern Atlantic and Arctic. This distribution is related to the atmospheric circulation and Gulf Stream drift. Temperature runs parallel to sunspots over a region extending from N.E. South America and the West Indies across Siberia and including Africa. Precipitation is opposed to sunspots over the tropical Atlantic and most of Africa and in the N. Atlantic-Arctic. These relations tend to be disturbed by explosive volcanic eruptions. *Subject Headings:* **1. Periodicities 2. Atmospheric circulation anomalies 3. Sunspot cycles.**

8A–8 551.583.13 551.583.2:523.74

Shostakovich, V. B., **Die Sonnenflecken. Periodicität in der Naturerscheinungen.** [Sunspots. Periodicities in natural phenomena.] Irkutsk, **1928.** 80 p. Russian and German. **DWB**—Collects a great deal of material, instrumental and historical, about periodicities of various lengths up to 425 years. (*Same item as* G–146, July 1950, *MAB.*) *Subject Headings:* **1. Climatic changes 2. Historical climates 3. Sunspots 4. Cycles.**

8A–9 551.583.13:523.746:551.590.23

Shostakovich, V. B., **Sonnenflecken und Planetenstand.** [Sunspots and planetary positions.] *Meteorologische Zeitschrift*, 45(10):388–390, Oct. **1928.** 2 tables. **DLC**—The geocentric position of Mercury has a 6.5 year periodicity. The position of Mars has a periodicity of 2.25 years, and of Jupiter 11 years. The combination of these gives periodicities of 2.44, 5.43 and 11.5 years, which are found approximately in sunspots, terrestrial magnetism and a number of meteorological and geophysical phenomena. *Subject Headings:* **1. Periodicities 2. Sunspot cycles 3. Planetary influences.**

1931–1935

8A–10 551.590.21:523.746:551.583.13

†Shostakovich, V. B., **Periodische Schwankungen in den Naturerscheinungen.** [Periodic fluctuations in natural phenomena.] *Beiträge zur Geophysik*, 30:281–335, **1931.** fig., 24 tables, 44 refs. **DLC**—Investigates periodicities of about 3, 6, 11, 17 and 30 years in a number of long series, including sunspots, earthquakes, volcanic eruptions, severity of winters, water levels, glacial records, lake deposits, tree rings, harvests, death rates and economic indices. Nearly all show periodicities approximating to those of sunspots, and the author constructs a diagram showing the chain of causation between solar variations and the various terrestrial phenomena, ending with historical events. A table of sunspot maxima and minima from BC 1295 to AD 1603.7 is included. *Subject Headings:* **1. Solar influences 2. Sunspots 3. Periodicities.**

8A–11 551.590.21:061.3

Abetti, Giorgio, **Le recerche sulle relazioni fra fenomeni solari e terrestre.** [Research on the relations between solar and terrestrial phenomena.] *Ricerca Scientifica*, Rome, 4(11):Nov. **1933.** 12 p. **DLC**—The history of the study of solar-terrestrial relations since 1850, and the formation in 1924 of the Committee for their study, are set out. The subjects for research are listed (including terrestrial magnetism and radio communication but excluding meteorology, which came in later). *Subject Headings:* **1. Solar influences 2. International Commission on Solar-Terrestrial Relationships.**

8A–12 523.746:551.583.13

Clough, H. W., **The 11-year sun-spot period, secular periods of solar activity, and synchronous variations in terrestrial phenomena.** *Monthly Weather Review*, 60:99–108, **1933. DWB**—The variation in the length of the 11-year sunspot cycle since 300 A.D. is due to periodicities of 37½, 83, 300 and about 1400 years. These periodicities are also found in frequency of severe winters, Chinese earthquakes, flood and low stages of the Nile, tree growth in America, wheat prices, raininess and ice on the Danish coast. *Subject Headings:* **1. Sunspot cycles 2. Periodicities.**

8A–13 551.590.21:551.577.33(43)

Düll, Bernhard, **Über den Einfluss der solaren Tätigkeit auf die Erdatmosphäre.** [On the influence of solar activity on the earth's atmosphere.] *Beiträge zur Geophysik*, 39:1-9, **1933.** 5 figs., 16 refs., German and English summaries p. 1–2. **DWB**—The relations between solar activity and atmospheric variations are too complex to be resolved by ordinary statistical methods. The effects on weather are attributed to sudden invasions of the atmosphere by α-particles, electrons and photoelectrically excited particles. Under favorable conditions these serve as nuclei of condensation. Examples are given for periods of a few to 27 days showing parallelism between sunspot relative numbers or geomagnetic character figures and rainfall in Germany, and opposition between sunspots or aurora frequency and pressure at Berlin and between magnetic character and visibility at Stettin. *Subject Headings:* **1. Solar influences 2. Rainfall variations 3. Germany.**

8A–14 551.521.13:517.512.2

Abbot, Charles Greeley, **Solar radiation and weather studies.** *Smithsonian Miscellaneous Collections*, 94(10), **1935.** 89 p. 38 figs., 13 tables. **DWB**—A periodogram investigation of 15 years of data found periodicities of solar radiation of 7, 8, $9\frac{3}{4}$, 11, 21, 25, 34, $39\frac{1}{2}$, 46 and 68 months, all submultiples of 23 years. Similar periodicities occur in long series of temperatures but phase changes by 180° at intervals, which are integral multiples of $11\frac{1}{2}$ years measured from Jan. 1819. Forecasts of temperature and pressure based on these were issued for 1934 to 1936 for U. S. and verified fairly well for 1934. (*Same item as* 2B–131, Feb. 1951, *MAB.*) *Subject Headings:* **1. Long range forecasting 2. Periodicities 3. Solar constant.**

1936–1939

8A–15 551.590.21:061.3

†Brooks, C. E. P., **The relations of solar and meteorological phenomena: a summary of the results from 1925 to 1934 inclusive.** *International Council of Scientific Unions, Fourth Report of the Commission for the Study of Solar and Terrestrial Relationships*, pub. Florence, **1936.** p. 147–154. 9 refs. **DLC**—This report discusses some papers which treat solar and terrestrial relations as more complex than the simple sunspot cycle. Several authors investigated the relations between solar changes and atmospheric pressure; some (S. Hanzlik, H. H. Clayton, C. J. Kullmer) found complex relations, others (C. E. P. Brooks, S. S. Visher) found no relation. Some relations to rainfall and thunderstorms are considered. Finally, theories of a solar cause of geological changes of climate (E. Huntington and S. S. Visher, G. C. Simpson, W. H. Bradley, M. Milankovitsch and W. Köppen) are summarized. The account is summarized in French by G. Abetti on p. 31–33. *Subject Headings:* **1. Solar influences 2. International Commission on Solar-Terrestrial Relationships.**

8A–16 551.583.13:523.746:551.509.33

Clayton, Henry Helm, **Long-range weather changes and methods of forecasting.** *Monthly Weather Review*, 64:359–376, Nov. **1936.** 21 figs., 7 tables, 7 eqs. **DWB**—The 25-month oscillation of pressure in the United States in 1874–1881, oscillations of monthly mean temperatures at Chicago 1900–1914 and the 11-month period in solar radiation and pressure at a number of stations, 1922–1928, are illustrated. World pressure departures at maxima and minima of the 11-month period are charted and discussed at length. Twelve-year oscillations of sunspots and temperature are next considered. By projecting these curves into the future for a network of stations and plotting the values read off for given epochs, forecast maps for any month are obtained. Examples are given for New York monthly temperatures. *Subject Headings:* **1. Periodicities 2. Sunspot cycles 3. Long range forecasting.**

8A–17 591.5:523.746

†MacLulich, D. A., **Sunspots and abundance of animals.** *Royal Astronomical Society of Canada, Journal*, 30:233–246, July–Aug. **1936.** 2 figs., 41 refs. **DLC**—Literature is reviewed dating back to 1878, dealing with abundance or migrations of grasshoppers, herrings, nutcrackers, lemmings, rabbits, etc. in relation to the sunspot and Brückner cycles. The fur returns of the Hudson's Bay Company are discussed, but the conclusion reached is that fluctuations of neither lynx nor varying hare are correlated with sunspots, but they are strongly correlated with each other. *Subject Headings:* **1. Sunspot cycles 2. Animal populations.**

8A–18 551.583.13:523.746(71)

Thomson, Andrew, **Sunspots and weather forecasting in Canada.** *Royal Astronomical Society of Canada, Journal*, 30:215–232, July, Aug. **1936.** 6 figs., 12 tables, 18 refs. **DLC**—The relations of sunspots to the solar constant, ultraviolet radiation and atmospheric electricity are briefly discussed. The author then examines variations of annual temperature, precipitation and cloud at Plains

stations in Canada during the sunspot cycle. The relations are useless for forecasting. *Subject Headings:* **1. Periodicities 2. Sunspot effects 3. Canada.**

8A–19 551.590.21:551.590.23:517.512.2

Jatho, Alfred, **Entwurf einer begleitenden Wellenzerlegung und deren Anwendung auf die periodischen Vorgänge in der Sonnen und Erdatmosphäre.** [Outline of a wave-shift and its application to periodic processes in the solar and terrestrial atmospheres.] *Annalen der Hydrographie und maritimen Meteorologie*, 66(8):392–404, Aug. **1938.** fig., 3 tables, 11 eqs. **DLC**—A method of analyzing periodical processes is described which is applicable to slight variations of period. It is shown that in the variations of sunspot numbers, solar radiation, geomagnetism and pressure three waves occur, with mean lengths of 4.8, 7.2 and 12 months. The reality of these waves is shown by the fact that for the first three phenomena they give almost exact parallelism over a long period. They are not accidental periods but are related to the periods of revolution of planets round the sun. *Subject Headings:* **1. Solar influences 2. Planetary influences 3. Periodogram analysis.**—*From author's abstract.*

8A–20 551.590.21:523.746

Stetson, Harlan T., **The sun and the atmosphere.** *Smithsonian Institution, Annual Report* **1938**:149–174. 7 figs., 3 plates. **DLC**—A popular account of radiations from the sun and their effects on the earth's atmosphere, frequency of auroras, geomagnetism, radio reception, temperatures and weather, especially relations to the sunspot cycle. The theory of sunspots is discussed. *Subject Headings:* **1. Solar influences 2. Sunspot cycle.**

8A–21 551.590.21:061.3

†Brooks, C. E. P., **The relations of solar and meteorological phenomena: a brief summary of the results from 1936 to 1938.** *International Council of Scientific Unions, Fifth Report of the Commission for the Study of Solar and Terrestrial Relationships*, pub. Florence, **1939.** p. 196–199. 17 refs. **DLC**—Brief summaries of 17 papers on solar variations, relations with atmospheric pressure, circulation and air masses, climate of Canada, droughts, tree rings and halos. *Subject Heading:* **1. Solar influences.**

8A–22 551.509.33:551.590.21

Tetrode, P., **Voorwaarden voor belangrijke invloeden van de zonnenvlekkenperiode op ons weer en een voorspelling op zeer langen termijn.** [Conditions necessary for important influences of the sunspot period on our weather and a very long period forecast.] *Hemel en Dampkring* 37:225–234, **1939.** 2 figs. **DLC**—Discusses variations of temperature, severe winters, etc. in sunspot cycle and periodical changes of phase. Author forecasts that after the seven warm years 1932–1938 there will be seven cooler years. (*Same item as* 2B–160, Feb. 1951, *MAB.*) *Subject Headings:* **1. Long range forecasting 2. Severe winters 3. Sunspots.**

1943–1945

8A–23 551.583.13:523.7

Clough, H. W., **The long-period variations in the length of the 11-year solar period, and concurrent variations in terrestrial phenomena.** *American Meteorological Society, Bulletin*, 24(4):154–163, April **1943.** 5 figs., table, 9 refs. **DWB**—Confirms the existence of 37 and 83 year periods in the length of the 11-year sunspot cycle. Both these periods themselves undergo a variation of length in a period of 300 years. Cycles in auroral frequencies, severe winter frequencies, Nile low water stages, growth of sequoia in California and wheat prices run closely parallel. The increase of solar activity represented by a decrease in length of the 11-year cycle also increases the strength of the atmospheric circulation. *Subject Headings:* **1. Periodicities 2. Sunspot cycles.**

8A–24 551.509.33:551.521.1

Abbot, Charles Greeley, **Solar variation and weather.** *Smithsonian Institution, Report* **1944** p. 119–153. 21 figs., 2 plates, 4 tables, 2 refs. **DSI**—After a general introduction on solar radiation author discusses effect of sequences of rising and falling solar activity on weather and shows curves of observed and predicted Washington daily temperatures. A 27-day period in Washington rainfall is described. Periodicities in solar radiation are set out and the claim is made that these are reflected in periodicities of weather. (*Same item as* 2A–23, Jan. 1951, *MAB.*) *Subject Headings:* **1. Solar radiation 2. Periodicities 3. Weather forecasting 4. Washington, D. C.**

8A–25 551.509.33:551.590.21

Abbot, C. G., **Weather predetermined by solar variation.** *Smithsonian Miscellaneous Collections* 104(5), **1944.** 44 p. 24 figs., 5 tables. **DLC**—Daily departures from normal temperature and

pressure at U. S. stations accompanying and following 440 sequences of about 4 days of rising or falling solar radiation are examined and means plotted for each month. It is found that solar changes may cause temperature changes of as much as 10–15°F for ten following days, and may affect weather from 4 days before to 20 days after the change of radiation. There are simultaneous changes of flocculi. Correlations with temperature are about 0.58. By means of the periodicity of 23 years and its sub-multiples in solar radiation, useful predictions can be made. *Subject Headings:* **1. Long range forecasting 2. Solar-weather relationships.**

8A–26 551.590.21 523.74

†Nicolet, M., **Introduction à l'étude des relations entre les phénomènes solaires et terrestres: le soleil.** [Introduction to the study of solar and terrestrial relations: the sun.] *Belgium. Institut Royal Météorologique, Miscellanées,* 11, [1945]. 138 p. 104 figs., 24 tables, 233 refs. **DWB**—The bulk of this important summary deals with solar phenomena: visual, photographic and spectroscopic observation of the sun, spectroheliographic observation of the solar atmosphere, the chromosphere, protuberances, spectrohelioscopic observation of solar eruptions, and solar corona. Finally, in Pt. 3 we come to relations between solar and terrestrial phenomena. The spectral distribution of solar energy at various air masses and of solar, sky and terrestrial radiation, action of the UV in producing erythema (decreasing with ozone content) and other biological effects of UV radiation, photosynthesis, heat balance of the atmosphere, variation of ozone with height and season, and ionization are all summarized with numerous diagrams. Finally, magnetic effects are discussed in detail. *Subject Headings:* **1. Solar activity 2. Solar influences.**

1947–1948

8A–27 523.7(08) 551.590.21

France. Centre National de la Recherche Scientifique, **Relations entre les phénomènes solaires et geophysiques.** [Relation between solar and geophysical phenomena.] Its *Colloques Internationaux,* No. 9, Sept. 1947. 312 p. figs., tables, refs. **GB-MO**—This volume consists of 44 papers, mainly concerned with the physics of the sun and the upper atmosphere. W. W. Salisbury and D. H. Menzel: **A theory of the origin of cosmic rays,** p. 31–33, attributes cosmic radiation to the acceleration of ionized particles in space near the earth and to fluctuations of electromagnetic radiation from sunspots. Localized clouds of ions give cosmic ray showers. M. Nicolet has a long paper (p. 35–68, 58 refs.) on: **Rayonnement solaire et origine de l'ionosphère** [Solar radiation and origin of ionosphere], and several other authors deal with ionization of the upper atmosphere. S. K. Mitra: **Some unsolved problems of the upper atmosphere** (p. 91–97, 45 refs.) summarizes the methods of study and atmospheric conditions of the various layers from 0–1000 km and problems still awaiting solution and further study. D. Barbier, **Rapport sur les aurores de basses latitudes,** [Report on low latitude auroras] (p. 182–192) deals mainly with auroral spectra and their origin, and other papers deal with auroral spectra. H. Garrigue, **Matérial d'observation pour le ciel nocturne et résultats nouveaux** [Observations of the night sky and new results] (p. 212–214); G. Dejardin, **Analyse spectrale du rayonnement du ciel nocturne** [Spectral analysis of the radiation of the night sky] (p. 215–216); J. Cabannes and J. Dufay, **Variation annuelle de l'intensité des bandes de Vegard-Kaplan dans le rayonnement du ciel nocturne** [Annual variation of the intensity of the Vegard-Kaplan bands in night sky radiation] (p. 217–235); J. Cabannes, J. Dufay and M.-L. Tcheng, **Ciel nocturne et phénomènes solaires** [Night sky and solar phenomena] (p. 237–240); P. Götz, **Bright night sky** (p. 241–243) and some other papers deal with night sky and twilight phenomena. P. Götz, **Périodicités dans les phénomènes de la haute atmosphère** [Periodicity in upper air phenomena], deals with a number of variations some of which affect weather. Ozone has a 3 year periodicity resembling that of surface-pressures and also shorter periodicities (20 and 36 days) which appear in daily pressures and give rise to singularities, and 27 days, which is solar. Finally, there are 3 papers on the zodiacal light and one on the variation of luminosity of the moon. *Subject Headings:* **1. Solar physics 2. Solar influences 3. Symposia.**

8A–28 551.513.7:523.74(268)

Eigenson, Moris S., **Solntse, pogoda i klimat.** [Sun, weather and climate.] *Vsesoiuznyĭ Geograficheskiĭ, S"ezd, 2nd, Leningrad, 1947, Trudy,* 1:202–209, **1948.** 8 refs. **DLC**—Researches at Pulkovo and other Leningrad institutes are discussed. They include the effects of specific impulses of solar activity on Arctic intrusions, at least part of these being linked with sunspot maxima. The direct influence of the solar constant on the troposphere is considered improbable; indirect action through the ozone layer is doubtful, the ozone thickness reacting to changes of the synoptic situation caused by solar activity and coinciding with geomagnetic storms, as shown by M. A. Prokof'eva. The reversal of the correlation between solar activity and ice conditions in the marginal seas of the Soviet Arctic is attributed to the accentuation of both cyclones and anticyclones by solar activity. Finally, in addition to the 11-year cycle there exists a much longer "secular" cycle

of 7.8×11 or 80–90 years. The recently introduced Pulkovo index of sunspot duration shows a much closer coupling with indexes of the atmospheric circulation than does the WOLF index. The secular change of solar activity caused a deepening of Arctic cyclones and their displacement eastwards, resulting in a warming up of the Arctic basin, which apparently ceased in 1939. *Subject Headings:* **1. Solar influences 2. Sunspot effects on weather 3. Solar cycles 4. Atmospheric circulation anomalies 5. Soviet Arctic.**—*A.M.P., C.E.P.B.*

8A–29 551.590.21:551.583.13

Polli, Silvio and Vercelli, Francesco, **Relazioni tra attività solare e fenomeni meteorologici e climatici, con speciale riguardo ai lavori computi in Italia.** [Relations between solar activity and meteorological and climatic phenomena, with special regard to Italian work.] *Trieste. Istituto Talassografico, Publicazioni*, No. 239, **1949.** [3p.] **DLC.** Also issued as: *Accademia Nazionale dei Lincei, Problemi attuali di scienza e di cultura, Quaderno*, No. 7, **1948.**—Periodogram analyses of sunspot relative numbers gave periodicities of 33, 11.2, 5.6, 3, 16, 8.3, 4.1 and 2 years. Analyses of geophysical phenomena (at least 100 yr series) gave 5.6, 11.2, 4, 8 and 16 years. The phase is generally about ¼ period behind that of sunspots. Sea levels gave 11.2 and 5.6 years. (*Same item as* 7.6–234, June 1956, *MAB.*) *Subject Headings:* **1. Solar influences 2. Periodicities.**

1950

8A–30 551.509.33:551.590.21:523.74

Baur, Franz, **Zurückführung des Grosswetters auf solare Erscheinungen.** [Origin of large scale weather in solar phenomena.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, 1(3/4):358–374, **1949**; 2(2/3):342–344, **1950.** 3 figs., 3 tables, 23 refs. German, English and French summaries 1:358–359. **DWB, MH-BH**—Rainfalls and pressures in temperate latitudes and severe winters in U. S. show a double oscillation in sunspot cycle. At spot maximum and minimum, planetary circulation weakens; 1½ to 2½ years earlier planetary circulation increases, subtropical highs move poleward and severe winters are fewer. Difference between areas of faculae and sunspots shows a correlated double variation owing to maximum of faculae 2 to 3 years before spot extremes. Faculae are rich in ultraviolet radiation and connection with surface pressure is probably through warming in upper convective layer. The second paper gives additions and corrections to the above. (*Same items as* 4–33 and 11–158, April and Nov. 1950, *MAB.*) *Subject Headings:* **1. Long range forecasting 2. Solar influences 3. Sunspots.**

8A–31 551.5:523.74

Prudhomme, André, **Le rôle de l'activité solaire dans les phénomènes atmosphériques.** [The role of solar activity in atmospheric phenomena.] *La Météorologie*, 4th Ser., No. 18:85–98, April–June **1950.** 4 photos, 29 refs. French, English and Spanish summaries p. 85. **DWB**—Solar constant variations, sunspots, chromospheric eruptions, variations in insolation, mechanism by which solar radiation affects the upper atmosphere and the troposphere, correlations between solar activity and pressure, temperature, precipitation, circulation and climate and, finally, solar methods of forecasting weather, discussed. (*Same item as* 2.3–5, March 1951, *MAB.*) *Subject Headings:* **1. Weather conditions 2. Solar influences.**—*M.R.*

1951

8A–32 551.590.21:551.515.4

†Brooks, C. E. P., **The relations of solar and meteorological phenomena.** *International Council for Scientific Unions, 7th Report of the Commission for the Study of Solar and Terrestrial Relationships*, pub. Paris, **1951.** p. 183–198. 41 refs. **DWB**—G. T. WALKER's and other theories of the effect of sunspots on weather are discussed. The evidence for a greater variation of UV than of ordinary radiation in the sunspot cycle combined with an "opacity" effect. The relations between pressure in the troposphere and stratosphere and UV radiation acting on the ozone layer are considered. Attention is then given to the possibility that the lower atmosphere is indirectly affected by variations of solar corpuscular radiation. Next the literature of the relations of sunspots and pressure, temperature and precipitation are summarized and the various theories as to the nature of the effect are considered. Finally, the mechanism of short period relations between solar variations and weather are examined. An unpublished investigation into the relation between daily sunspot numbers and thunder days, 0–30 days later, in 1908 (a year of moderate solar activity) gave positive correlations, probably real, with a lag of 15–18 days. This was strongly confirmed by the figures following an isolated outbreak of sunspots on Nov. 9. It is concluded that relations between sunspots and weather are probably real, but not clear-cut, and the chain of cause and effect is far from being established. (*Same item as* 3.7–198, July 1952, *MAB.*) *Subject Headings:* **1. Solar influences 2. Thunderstorm activity.**

8A–33 551.590.21:523.74

Craig, Richard A., **Solar variability and meteorological anomalies.** *American Academy of Arts and Sciences, Proceedings*, 79(4):280–290, July **1951.** table, 10 refs. **DWB**—Author summarizes the present status of the problem of the relationship of irregular variations in solar energy to irregular variations in the weather. The discussion covers the correlation of annual mean sunspot number with surface pressure, temperature and precipitation (WALKER); mean pressure centered at three-year sunspot minimum with mean pressure centered at three-year sunspot maximum (HANZLIK); and short period solar variations with meteorological variables (ABBOT, DUELL, Harvard College Observatory). (*Same item as* 3.8–212, Aug. 1952, *MAB.*) *Subject Headings:* **1. Sunspot effects 2. Pressure 3. Temperature 4. Precipitation.**—*I.L.D.*

8A–34 551.583:523.74

†Craig, Richard A. and Willett, Hurd Curtis, **Solar energy variations as a possible cause of anomalous weather changes.** (In: **Compendium of meteorology.** Boston, American Meteorological Society, **1951.** p. 379–390. 28 refs.) **MH-BH**—Description of the variable solar activity and of climate and weather fluctuations and a summary of research work in this field. The solar hypothesis as the primary factor controlling the entire spectrum of anomalous climate and weather changes from geological to daily fluctuations is discussed. The authors claim that the subject deserves careful study, as long as there remains a reasonable possibility of solar influences on irregular weather changes. (*Same item as* 4.5–3, March 1953, *MAB.*) *Subject Headings:* **1. Solar energy variations 2. Climatic variations 3. Compendium articles.**—*A.A.*

1952

8A–35 551.590.21 551.543:550.385:551.521.63

†Koppe, Heinrich, **Solare Aktivität und Atmosphäre.** [Solar activity and the atmosphere.] *Zeitschrift für Meteorologie*, 6(12):369–378, Dec. **1952.** 3 figs., 2 tables, 68 refs. **DWB**—Various studies on the relationship of sunspot cycles with variations in atmospheric temperature, atmospheric circulation and precipitation and studies on the relationship of short term variation in solar activity as expressed by the geomagnetic characteristics and oscillations in atmospheric pressure are summarized briefly. By means of a statistical evaluation of data on geomagnetic characteristics from BARTELS and the Wingst Observatory it is shown that the correlation between geomagnetic disturbances and oscillations of atmospheric pressure, tested by *t*-Test is greater than chance in Scandinavia. The singularities appearing in the annual course of atmospheric pressure are attributed to harmonic oscillations related to fixed calendar dates; the reality of these singularities is likewise statistically significant. The pressure oscillations are regarded as caused by variations in solar activity that occur at fixed dates and the mechanism of this action is excessive ultraviolet radiation. (*Same item as* 4.11–267, Nov. 1953, *MAB.*) *Subject Headings:* **1. Pressure oscillations 2. Singularities 3. Solar influences 4. Magnetic disturbances 5. Ultraviolet radiation 6. Scandinavia.**—*I.L.D.*

1953

8A–36 551.521.1 551.590.21

†Abbot, Charles G. (*Res. Assoc., Smithsonian Inst.*), **Solar variation, a leading weather element.** *Smithsonian Miscellaneous Collections*, 122(4), Aug. **1953.** 35 p. 22 figs., 3 tables, 32 refs. *Smithsonian Institution, Publication*, 4135. **DLC**—The author maintains that: 1) statistically derived results may be accepted without a supporting theory; 2) a conclusion may be accepted as a working hypothesis without being rigidly proven or 3) if phenomena which stem from a related source are harmonious with the basic proposition. As a working hypothesis he combines 5 propositions and shows how they are supported by correlations with 5 other phenomena. The propositions concern solar radiation variability with a period of $22\frac{3}{4}$ years or subordinate periodicities related to $22\frac{3}{4}$ years. Also solar radiation variations strongly affect weather (temp., precip., etc.) irrespective of periodicities, and lastly the weather responds strongly to the regular periodic solar variations (solar faculae, sunspots, solar flocculi, magnetic storms and ionospheric changes are the phenomena showing high correlation with the above.) A large amount of graphic data is presented in support. (*Same item as* 5.2–127, Feb. 1954, *MAB.*) *Subject Headings:* **1. Solar radiation variations 2. Solar influences 3. Correlations.**—*M.R.*

8A–37 551.509.33:551.590.21:523.74

Baur, Franz, **Die Abhängigkeit des Grosswetters von solaren Erscheinungen.** [The dependence of large-scale weather on solar phenomena.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, 6(2):129–152, Dec. **1953.** 3 figs., 8 tables, 19 refs. German, English and French summaries p. 129–131. **DLC**—Very cold winters in central Europe are much more frequent at or shortly after sunspot maximum and shortly after spot minimum than at other times. At New Haven, Conn.,

hot summers occur 3–1½ years before spot extremes. Dry summers in Germany, related to excess pressure over Central Europe, come 2.8 1.9 years before spot extremes. These examples show an undoubted relation of general weather types to solar processes. In Pt. III multiple correlations are found between severity of winter in Central Europe and sunspot conditions since preceding Feb. In Pt. IV the double oscillation of general weather type in sunspot cycle is related to variations in the strength of the zonal circulation at 500 mb in mid-latitudes, due to persistent changes of solar radiation especially in U.V. (*Same item as* 5.6-73, June 1954, *MAB.*) *Subject Headings:* **1. Grosswetter 2. Solar influences.**

8A–38 551.577.33:551.590.21

Eigenson, M. S., **O mnogovekovom izmenenii solnechnoĭ aktivnosti i ego geofizicheskikh posledstviiakh.** [Secular changes of solar activity and their geophysical consequences.] *Vsesoiuznoe Geograficheskoe Obshchestvo, Leningrad, Izvestiia,* 85(3):286–287, May/June, **1953.** 5 refs. Also his: **O 5–6-letnem tsikle solnechnoĭ aktivnosti i solnechno-obuslovlennykh geofizicheskikh iavleniiakh.** [The 5–6 year cycle of solar activity and geophysical phenomena due to solar influences.] *Ibid.*, p. 287–289. 4 refs. **DLC**—The existence of solar cycles having periods of the order of 80–90 years has been pointed out by A. I. Ol'. B. M. Rubashev and others have demonstrated similar cycles of solar activity. L. S. Berg has shown that mean annual temperature at Berlin increased by 0.3°C during the period 1848 1907 above that during 1756–1847 but the average temperature of fall and winter increased by 1°C. Similar increases in temperature are cited for other localities: London, Leningrad, etc. In his second paper the author established the definite existence of a double maximum in the 11-year period consisting of a 5 and 6 year cycle. Various geophysical phenomena in the upper atmosphere dependent upon solar influences were found to exhibit a double maximum during the 11 year solar period: namely, thunderstorms in Central Europe, cold waves in European U.S.S.R., level of Scandinavian lakes, relative activity of tropical and polar air, etc. (*Same item as* 5.11–208 and 209, Nov. 1954, *MAB.*) *Subject Headings:* **1. Solar cycles 2. Solar influences 3. Annual temperature variations.**—*I.L.D.*

8A–39 551.590.21

McIntosh, D. H., **Solar and terrestrial relationships.** *Meteorological Magazine,* London, 82(967):11–15, Jan. **1953.** 7 refs. **DWB**—A critical discussion of the relations between day-to-day solar and troposphere changes finds no clear proof of a direct link between them. It is suggested that "the ozone layer represents the only possible link between the sun's variations and surface weather reactions." (*Same item as* 4.6–230, June 1953, *MAB.*) *Subject Heading:* **1. Solar influences.**

8A–40 551.586:612.551:551.590.21

†Reiter, Reinhold, **Beziehungen zwischen Sonneneruptionen, Wetterablauf und Reaktionen des Menschen, dargestellt am Verlauf der Infra-Langwellenstörungen, der Geburtenziffer und der Verkehrsunfallziffer.** [Relations between solar eruptions, weather and human reactions shown by the course of infra-longwave disturbances, birth rates and figures of traffic accidents.] *Angewandte Meteorologie,* 1(10):289–303, June **1953.** 6 figs., table, 63 refs. **DWB**—The most important solar phenomena and their terrestrial consequences are described and their use in helio-biological statistics examined. The method of investigating longwave (J) disturbances and their relation to regional (not world-wide) thunder activity and lability are explained. It is found that in Germany and Austria, 2 days after a chromosphere eruption near the central meridian, births, traffic accidents and J disturbances all increase. Eruptions on the east edge of the sun bring an immediate increase, and a further increase 4–6 days later. Author considers that biological relations to solar activity are indirect, through weather effects. (*Same item as* 4.11–259, Nov. 1953, *MAB.*) *Subject Headings:* **1. Solar influences 2. Bioclimatology.**

8A–41 551.513:523.45:523.746

Shapiro, Ralph, **A planetary-atmospheric response to solar activity.** *Journal of Meteorology,* 10(5):350 355, Oct. **1953.** fig., 4 tables, 6 refs. **DWB**—From a series of photometric measurements on photographs of Jupiter's visible surface, a close relation was found between Jupiter's albedo and relative sunspot numbers. For the whole disk correlation was 0.91, increasing from 0.5–0.6 near equator to 0.75–0.8 in lat. 60°N and S. The cause of the relation is obscure; it is tentatively attributed to trigger effects of sun's ultraviolet radiation on height variations of the clouds of crystalline ammonia forming Jupiter's atmosphere. (*Same item as* 5.3–142, March 1954, *MAB.*) *Subject Headings:* **1. Planetary circulation 2. Jupiter 3. Sunspot effects.**

8A–42 551.590.21

Vassy, A. and Vassy, E., **Mécanisme possible de l'action de l'activité solaire sur la basse atmosphère.** [Possible mechanism of the effect of solar activity on the lower atmosphere.] *International Council of Scientific Unions, Brussels, Mixed Commission for the Study of Solar and Terrestrial*

Relationships, Rome, Sept. 1952, Proces Verbal, p. 30–32, pub. **1953.** 14 refs. **DWB**—Relation between solar activity and tropospheric phenomena cannot be due to heating of ozone, which exists in insufficient amount. Authors attribute it to absorption by oxygen around 2000 Å between 25 and 50 km. (*Same item as* 5.8–268, Aug. 1954, *MAB.*) *Subject Heading:* **1. Solar influences.**

8A–43 551.5:523.75

§Valníček, Boris (*Astrophys. Observatory Ondrejov, Czechoslovakia*), **Les éruptions chromosphériques et le temps.** [Chromospheric eruptions and the weather.] *Bulletin of the Astronomical Institutes of Czechoslovakia*, Prague, 3(5):71–76, Sept. 30, **1952.** 3 figs., table, 14 refs. Also his 3 other articles [all same title], *Ibid.*, 4(2):48–51, **1953.** figs., 5 refs. Russian summary p. 51. *Ibid.*, 4(4):97–99, **1953.** figs., 3 refs. Russian summary p. 99. *Ibid.*, 4(6):179–181, **1953.** 4 figs., 4 refs. Russian summary p. 181. Also Link, F. [same title], *Ibid.*, 5(1):7–9, **1954.** table, refs. Russian summary p. 9. **DLC**—Analysis of synoptic data for Europe before, during and after chromospheric eruptions in 1936 and 1947 (years of maximum activity) shows that there is "a definite influence" of these eruptions on the general circulation and weather conditions in Europe during the week following the eruption. In Vol. 3, No. 5, temperature and pressure variations at 25 European stations are statistically analyzed. A marked displacement of the frontal zone toward lower latitudes is found to follow the chromospheric eruptions. In Vol. 4, No. 2, synoptic charts for Europe are analyzed. Composite charts of pressure for −5, −2, 0, +2, +4 and +8 days before and after flare show a change from zonal to meridional flow and possibility of rainy weather during the first few days after the eruption. In Vol. 4, No. 4, temperature, pressure and precipitation records (1947) for 3 stations in Bohemia are analyzed for periods from 5 days before, to 75 85 days after the eruptions. In Vol. 4, No. 6, 500 mb charts for 1949 and 1950 are used. They reveal a marked rise of the 500 mb level over Northern Europe during the eruptions, followed by a lowering of the level five days after the eruptions. The method applied to all phases of the study involves summation of the data connected with eruptions, and comparison of these composite data with average conditions. Each factor analyzed is claimed to reflect the effect of chromospheric eruptions on weather. Link criticizes the method and conclusions reported in Valníček's paper in Vol. 3, No. 5. *Subject Headings:* **1. Chromospheric eruptions 2. Solar-weather relationships.**—*M.R., G.T.*

1954

8A–44 551.590.21:523.74

Maksimov, I. V., **O nekotorykh geograficheskikh proiavleniiakh odinnadtsatiletnego tsikla solnechnoĭ aktivnosti.** [Some geographic manifestations of the eleven-year cycle of solar activity.] *Akademiia Nauk SSSR Izvestiia, Ser. Geograf*, No. 1:15–32, Jan./Feb. **1954.** 7 figs., 7 tables, 19 refs. **DLC**—The 11-year oscillation in sea level, North Atlantic ice, and precipitation in Western Europe is discussed. The apparent absence of a relationship in certain cases is attributed to the complexity of the phenomena, which can only be elucidated by periodogram analysis. Periodograms for 1900–1940 of annual number of deep cyclones, Atlantic circulation and meridional pressure gradients, ice in Greenland Sea and near Iceland, etc. show a hidden cycle of 8–14 years, which is directly connected with a similar cycle of solar activity. *Subject Headings:* **1. Solar relations 2. Solar cycles.**—*A.M.P., C.E.P.B.*

1955

8A–45 551.509.33:523.755(73)

Farthing, E. D. (*Trans World Airlines, Inc., Kansas City, Mo.*), **A possible relationship between the solar corona and weather conditions in the central midwest.** *American Meteorological Society, Bulletin*, 36(9):427–435, Nov. **1955.** 5 figs., 2 tables. Also: London, Julius, [**Criticism of above article**]. *Ibid.*, 37(6):309, July **1956. Reply** by E. D. Farthing, *Ibid.*, p. 309–310. table, 2 refs. **DWB, DLC**—The existence of a relationship between intensity of solar radiation and terrestrial weather conditions has been investigated by analyzing changes in coronal emission intensities in the green (5303Å) and red (6374Å) lines on the day of Central Meridional Passage of the region of the spectrum emitting these lines and corresponding daily changes in air temperature and precipitation in Kansas City, Mo. It was found that temperature in the Central Mid-west rises steadily with the approach toward Central Meridional Passage of a center of intensified solar emission in the green line reaching a maximum hour day of CMP. After this time a cold front passage occurs and lower temperatures characterize the following five days. Also "precipitation in the Central Mid-west (and probably in many areas) is controlled, at least in part, by solar radiation whose effects are measured by changes in intensities in the 5303Å and 6374Å lines of the solar spectrum. Excessive spring, summer and fall precipitation is associated with a high green-to-red ratio, with the reverse being true when the red emission intensely exceeds that of the green. Precipitation occurs more often, and is usually heavier near CMP of centers of the heightened green emission." *Subject Headings:* **1. Solar-weather relationships 2. Coronal emission intensity variations 3. Long range forecasting 4. United States.**—*I.L.D.*

8A–46 523.755:551.590.21

*Farthing, E. D., **Progress report on solar-weather research utilizing a daily computed index of solar coronal activity as the solar parameter.** *Trans World Airlines, Inc., K. C. Missouri, Meteorology Section, Meteorological Technical Bulletin*, No. 55–7, Sept. 15, **1955.** 27 p. 12+figs., 2 tables, 9 refs. **DWB**—Continuing the work done in 1951–1954 (*see* 8A–115), the author shows more refined and expanded correlations between the Central Meridian Passage of an intensified area of green solar coronal line (compared to the red emission). He concludes that temperature, precipitation and 500 mb west wind component for Kansas City, or area to the west covered by TWA flights, are strongly correlated with these passages. Many charts and graphs show nature and degree of correlation based on 1 year (1954–55) of record. The number of cases used for each correlation are admittedly low (5–8 cases), but the results appear encouraging. A mechanism (photochemical) for linkage is suggested. *Subject Headings:* **1. Sun's corona 2. Solar influences.**—*M.R.*

8A–47 551.509.33:523.755(73)

Farthing, E. D., **Solar activity-weather research.** *Trans World Airlines, Inc., Kansas City, Mo., Meteorological Technical Bulletin*, No. 55–3, Jan. 26, **1955.** 5 p. tables. Mimeo. **DWB**—Detailed analysis of data for Feb. 1951–4 attempts to show relation between solar (coronal) emission intensities obtained at the High Altitude Observatory and temperature anomalies at Kansas City to serve as a basis for predicting Feb. 1955 weather at Kansas City. *Subject Headings:* **1. Solar influences 2. Coronal emission data 3. Kansas City, Mo. I. Trans World Airlines, Inc.**—*M.R.*

8A–48 551.583.13:551.590.21

†Polli, Silvio, **I cicli climatici di 5,6 e 8,0 anni e la loro realtà fisica.** [Climatic cycles of 5.6 and 8.0 years and their physical reality.] *Rivista di Meteorologia Aeronautica*, Rome, 15(2):3–12, April/June **1955.** 5 figs., table, 33 refs., eq. Italian, French, German and English summaries p. 3. **DLC**—The examination of nearly 100 periodic and harmonic analyses of long series of climatic elements, enables the writer to point out the existence, actual reality and remarkable amplitude of climatic cycles of 5.6 and 8.0 years. The latter manifest themselves all over the earth's surface. Their amplitude is of the same order as, and is often superior to, the amplitude of the 11-year cycle. They maintain a constant period. As to their phase, it changes for every element, according to the region under consideration. These cycles undergo particular amplifications and attenuations of a universal character. *Subject Headings:* **1. Climatic cycles 2. Solar influences.**—*Author's abstract.*

1956

8A–49 551.509.33:523.74(73)

Farthing, E. D., **Utilizing the sun to forecast the weather.** *Shell Aviation News*, 214:19–24, April **1956.** 4 figs. **DWB**—Daily changes of temperature, precipitation and upper winds in U. S. A. are related to changes of coronal radiation in the green (5303Å) and red (6374Å) emission lines from active areas at Central Meridian Passage (CMP). It is found that temperature in the central Midwest normally rises steadily with the approach of a center of intensified solar emission, reaching a maximum near day of CMP, followed by a cold frontal passage with markedly lower temperatures in the following 5 days. Excessive precipitation in summer and fall is associated with heightened green emission (high green/red ratio indicating high coronal temperature) near CMP. An index is derived for solar activity by summing for the entire east limb

$$I = 5303\text{Å}/6374\text{Å} \times (5303\text{Å} + 6374\text{Å}).$$

The warmest days occurred about day (CMP)+3. Precipitation at New York was most frequent and heaviest with high solar activity, and was heavier and earlier in time and declined more rapidly the higher the solar activity. These effects are associated with RIEHL's discovery that at almost every coronal maximum a warm 500 mb ridge builds up off the Pacific coast and a trough moves into the Great Basin area. The average change of the coast-to-coast westerly component at 500 mb appears to go through a regular cycle from one solar maximum to the next. Various problems of causation and procedure are discussed. *Subject Headings:* **1. Long range forecasting 2. Solar activity 3. United States.**

8A–50 551.509.33:523.746

Willett, Hurd C., **Cold weather ahead!** *Saturday Evening Post*, Philadelphia, 228(30):23–25, 122–124, March 24, **1956.** photos, diagrs. **DLC**—On the basis of an 80 year sunspot cycle, the author predicts that the next 40 years will see a return to "old fashioned winters" with deep snow and cold weather in the United States, because of a predicted period of low sunspot activity. He does not go along with those who predict increasing hurricane frequency in the Atlantic States attendant on general warming. A moist cycle will reduce drought frequency in Great Plains until 1975 or 1980 when a possible lesser drought period may ensue, and will cause Great Salt Lake to expand and

flood its shores. High and low sunspot activity periods from 1755 to date are reviewed with comments on attendant weather conditions in various places. *Subject Headings:* **1. Long range forecasting 2. Solar-weather relationships.**—*M.R.*

2. TEMPERATURE

1929

8A–51 551.524.33:523.73(481)

Wasserfall, K. F., **On the relation between the rotation of the sun and variations in atmospheric temperature.** *Geofysiske Publikasjoner*, Oslo, 5(10), **1929.** 18 p. 6 figs., 6 tables, footnote refs. **DLC**—Daily temperatures for Oslo in 1916 show well defined, fairly regular oscillations of 27.3 days, especially in May–Oct. with a (corrected) amplitude of 3.8°C, and of 13.6 days (4.0°C). There are changes of phase in May and Dec. (27 day) or October (13 day). The maxima of the 27 day oscillation fall about 12 days after the passage of spot-free areas across the center of the apparent solar disk. At Stockholm, 1908–12, WALLÉN found a 28-day oscillation of 4.5°C. The curve of Oslo temperature made up from the annual, 27 and 14 oscillations agrees closely with the smoothed curve of daily temperatures. Elimination of the longer waves brings out an oscillation of about 4 days, amplitude 3.3°C, also found by ABBOT in his solar constant data for 1916. *Subject Headings:* **1. Temperature periodicities 2. Solar rotation 3. Norway.**

1935

8A–52 551.524.33(481):523.74:517.512.2

Wasserfall, K. F., **The 27-day period in temperature data.** *American Geophysical Union, Transactions*, **1935**:161–162. 2 figs., 2 tables. **DLC**—Reports the discovery of a 27-day periodicity in Oslo temperature, with amplitude 4°C. The wave reverses from winter to summer. The average length in different years increases from 26–30 days with increasing heliographic latitude of the sunspot zone. As the latter goes from 0–10° to 30–40°, the rotation period increases from 27 to 29 days. In an earlier paper (*see* 6A–51), WASSERFALL found periodicities of 27.3 and 13.6 days in Oslo temperatures in 1916, with amplitudes of 3.9 and 4.7°C. *Subject Headings:* **1. Temperature variations. 2. Solar activity 3. Periodicities 4. Oslo, Norway.**

1946

8A–53 551.583.13:523.746

Clayton, H. H., **Sunspot changes and weather changes.** *Smithsonian Miscellaneous Collections*, 104(19), **1946.** 29 p. 22 figs., 10 tables. **DLC**—Comparison of daily temperatures in U. S. on days preceding and following sunspot maxima shows that following outbreaks of sunspots cold weather develops in the north and moves SE as a cold wave, the fall of temperature depending on the change of spottedness rather than the absolute level. This is related to the frequency of origin of anticyclones and pressure falls. The monthly changes of pressure in winter and summer accompanying monthly increases in sunspots are mapped for the Northern Hemisphere. World relations between sunspots and 3 year means of pressure, and annual precipitation, are also shown. The results are complex, involving a latitude effect, a different effect on land and sea surfaces, diurnal and seasonal effects, progressive waves and oscillations. *Subject Headings:* **1. Periodicities 2. Sunspot effects.**

1947

8A–54 551.524.33:551.590.21

Abbot, C. G., **The sun's short regular variation and its large effect on terrestrial temperatures.** *Smithsonian Miscellaneous Collections*, 107(4), **1947.** 33 p. 12 figs., 9 tables. **DLC**—A periodicity of 6.6456 days was found in the solar constant, 1924–1944, with an abrupt rise and slower fall, first maximum Jan. 3, 1924, amplitude 0.13%. The same periodicity was found in Washington temperature, 1910–1945. The mean maximum appears to be 3–4 days after the radiation maximum but shifts of phase up to ±3 days may occur. The amplitude varies from 2–20°F, mean 5°F. The disproportionate relation is attributed to large percentage changes in extreme ultraviolet solar radiation causing large changes of the ozone layer. A trial forecast was moderately successful (average error 6.5°F). *Subject Headings:* **1. Temperature variations 2. Solar influences.**

1952–1954

8A–55 551.524.35:523.74

Tetrode, P., **Sunspots and the occurrence of unprecedented excesses of mean temperature over a wide area.** *Weather*, 7(1):14–15, Jan. **1952.** table, 8 refs. **DWB**—High mean temperatures for

April 1947–March 1950 were about equal to 3 years 1778–1781 in Europe and probably the U. S
At beginning of each warm spell sunspot numbers reached record annual means (1778, 154; 194
151). (*Same item as* 3.6–106, June 1952, *MAB.*) *Subject Headings:* **1. Temperature variation
2. Sunspot effects.**

8A–56 551.524.7:523.746(92

Untersteiner, N., **Über Schwankungen der barometrischen Mitteltemperatur an einem tr
pischen Stationspaar.** [On variations of barometric mean temperature at a pair of stations in th
tropics.] *Akademie der Wissenschaften, Vienna, Sitzungsberichte Math.-Naturw. Klasse, Abt. II*
161(7–8):207–218, **1952.** 2 figs., 2 tables, 23 refs. **DLC**—From pressures at Batavia (sea leve
and Mt. Pangerango (3023 m), the mean temperature of the intervening air column is compute
The values show a clear 5-year periodicity, amplitude 0.26°C. Temperature maxima occur at midd
values of the sunspot curve. There is practically no 11-year cycle. *Subject Headings:* **1. Upper a
temperature variations 2. Sunspot cycles 3. Java.**

8A–57 551.509.33:551.524.33:551.521

Abbot, Charles Greeley, **Long-range effects of the sun's variation on the temperature of Was
ington, D. C.** *Smithsonian Miscellaneous Collections*, 122(1), May 12, **1953.** 14 p. 4 figs., 7 table
DWB—In continuation of his papers on solar-terrestrial relationships, the author makes an analys
of temperature in Washington, D. C., for the period 1854 1939, based on his assumption of per
odicities in solar radiation, submultiple of $22\frac{3}{4}$ years. A synthesis is presented for 1940–52, allowin
unpredictable shifts of phases, and a forecast of monthly means up to Dec. 1959. (*Same item*
5.7–57, July 1954, *MAB.*) *Subject Headings:* **1. Long range forecasting 2. Temperature for
casting 3. Temperature periodicities 4. Solar influences 5. Washington, D. C.**—*A.A.*

8A–58 551.590.21:551.5

Hanzlík, Stanislav, **Teplotní efekt periody slunečních skvrn ve Střední Evrope.** [Temperatu
effect of the sunspot period in Central Europe.] *Meteorologické Zprávy*, 6(2):31–34, May **195**
figs., tables.—The table and graphs presented contain the final results of a study in which lon
period temperature records for Prague, Vienna, Jena and other Central European stations we
investigated (by means of Mecking's method) in connection with sunspot maxima and minima.
is found that Central European temperature records reflect the double period of sunspot activit
(Hale effect) in addition to the single period (this latter had been identified for a long time). (*Sam
item as* 5.10–217, Oct. 1954, *MAB.*) *Subject Headings:* **1. Sunspot effects on temperature 2. Centr
Europe.**—*G.T.*

8A–59 551.524.33:523.74

Voigts, Heinrich, **Gang der Temperaturen im Sonnenfleckenzyklus. Mitteil. IV.** [Ten
perature distribution during sunspot cycle. Report IV.] *Zeitschrift für Meteorologie*, Berli
8(6):173–177, June **1954.** 3 figs., 5 refs. **MH-BH**—The variation of summer and winter ten
peratures within the sunspot cycle was analyzed for various stations in Europe, Australia an
America. Curves showing temperature amplitudes for Paris, Bremen, Greifswald, Wurzburg an
Munchen, Adelaide, Sydney, Brisbane, Alice Springs and Port Darwin and New York and Sa
Francisco are presented. Analysis of these curves indicates that certain periods in the sunspot cyc
exert large scale steering effects. *Subject Headings:* **1. Temperature variations 2. Sunspot cycle
3. Europe 4. Australia 5. United States.**—*I.L.D.*

3. PRESSURE, STORMINESS AND WINDS

1923

8A–60 551.543.3:551.521.1

Clayton, Henry Helm, **World weather.** New York, Macmillan, **1923.** 393 p. figs., plate
tables, refs. **DWB**—Maps of pressure deviations from normal in months of high solar radiatio
compared with low solar radiation are drawn. They "indicate that the effect of an increase of sola
radiation is to intensify the normal distribution of pressure and at the same time displace the cente
of high and low pressure in high latitudes towards the poles." The result is that pressure at an
given place rarely follows the solar radiation even when the annual period is eliminated. Difference
between pressure at sunspot maxima and minima, 1858 1919, are also discussed. Every increase
solar radiation causes a fall of pressure near the equator at every season, but the air which passe
outward to higher latitudes raises the pressure over the continents in winter and over the oceans i
summer. This rise occurs in 40–60° N. north of the normal positions of the high pressure centers
near the Arctic circle over the oceans pressure falls when solar radiation increases. With increase

radiation pressure falls over the interior of the continents in summer, and in the Icelandic and Aleutian lows. The more intense the solar radiation the greater the fall of pressure in the tropics, the wider the belt of diminished pressure, and the higher the latitude of the zones of excess pressure. With very high values as in July 1917 the maximum excess of pressure is found north of 60°N. (*Same item as* 2A–46, Feb. 1951 and 3C–147, March 1952, *MAB.*) *Subject Headings:* **1. Pressure variations 2. Solar radiation variations.**

1928

8A–61 551.543:523.746

Brooks, C. E. P., **Sunspots and the distribution of pressure over Western Europe.** *Great Britain. Meteorological Office, Professional Notes*, No. 49, **1928.** 6 p. 5 tables. At head of t.-p. *M.O.* 273i. **DWB**—The frequency of different types of monthly pressure distribution in periods of sunspot minimum, rising sunspots, spot maximum and falling sunspots was compared with expectations (40 years). A slight tendency was found for pressure to be high over Iceland with rising sunspots, and low with falling sunspots, but the significance was small. Quarterly pressures at Stykkisholm (1846–1926), Berlin (1848–1923), Valentia (1866–1926) and Ponta Delgada (1865–1926) were compared with sunspot numbers, but no significant results appeared. *Subject Headings:* **1. Pressure variations 2. Sunspots.**

1931–1934

8A–62 551.543.3:523.74

Peppler, Albert, **Energieschwankungen der nordatlantischen Zirkulation und Sonnenflecken 1881–1923.** [Energy oscillations of the North Atlantic circulation and sunspots 1881–1923.] *Beiträge zur Geophysik*, 29:187–200, **1931.** **DWB**—DEFANT's data for 1881–1905 of meridional pressure gradient in North Atlantic are brought up to 1923. Persistence effect small. A 22-year cycle is found. (*Same item as* 2B–107, Feb. 1951, *MAB.*) *Subject Headings:* **1. Long range forecasting 2. Atmospheric circulation 3. Persistence 4. Sunspots 5. North Atlantic.**

8A–63 551.515.13(73):523.746

Kullmer, C. J., **The latitude shift of the storm track in the 11-year solar period. Storm frequency maps of the United States, 1883–1930.** *Smithsonian Miscellaneous Collections*, 89(2), **1933.** 34 p. figs. **DLC.** Review by F. Steinhauser in *Meteorologische Zeitschrift*, 51(8):316–318, Aug. **1934.** **DWB**—The distribution of cyclonic centers over the United States 1883–1930 shows a latitude shift of the storm tracks corresponding with the latitude shift of sunspots. Near sunspot maximum there is an excess of storms in the north and a deficit further south; near sunspot minimum these conditions are reversed. In the review, STEINHAUSER points out that the 48 year period includes 5 sunspot maxima but only 3 maximum shifts of the storm track, and the correlation is only +0.25. The correlation of cyclone frequency with sunspots is +0.30. Neither relation is statistically proved. *Subject Headings:* **1. Cyclone tracks 2. Sunspot cycles. I. Steinhauser, F.**

8A–64 535.4:551.593.1:523.746

Tilton, L. W., **Variations in refractive index of CO_2-free dry air and a statistical correlation with solar activity.** *U. S. National Bureau of Standards, Journal of Research*, 13:111–124, July **1934.** 2 figs., table, footnote refs. **DLC**—Refractometric analyses of air between 1857 and 1932 are examined. Refractive index data show a correlation of −0.48 (40 pairs) with annual sunspot relative number, but with a superposed cycle of 23 years corresponding to the magnetic cycle. The mean relation is $(\mu_D - 1) \times 10^7 = 2932.2 - 0.148$ S. The relation is attributed to the positive correlation between sunspots and terrestrial storminess. At low spot numbers "a decrease in the average rate of stirring and mixing of the air allows certain denser components (perhaps associated molecules or isotopes) to settle and produce at the earth's surface a gaseous mixture having a slightly higher index of refraction." *Subject Headings:* **1. Refractive index 2. Sunspot numbers.**

1936–1937

8A–65 551.509.33:523.74

Petitjean, L., **Activité atmosphérique et activité solaire.** [Atmospheric and solar activity.] *Annales de Physique du Globe de la France d'Outre-mer*, 3(17), Oct. **1936.** 7 p. fig., 10 charts. **DWB**—Anomalies of mean annual pressure were opposite in sunspot maximum years 1883 and 1893. An inverse symmetry point occurred in monthly sunspot numbers and monthly pressure deviations in 1888; this was discovered in 1889 and enabled author to forecast mean pressure deviations correctly in 1890–1892. (*Same item as* 2B–141, Feb. 1951, *MAB.*) *Subject Headings:* **1. Long range forecasting 2. Sunspots 3. Symmetry points.**

8A–66 551.543:523.73

Braun, Gerhard, **Quasiperiodische Sonneneinflüsse auf meteorologische Vorgänge.** [Quasi-periodic solar influences on meteorological processes.] *Meteorologische Zeitschrift*, 54(2):50–61, Feb. **1937.** 6 figs., 4 tables, 8 refs. **DLC**—The methods of random walks and harmonic dials are applied to the investigation of quasiperiodicities in the interdiurnal variation and 6 hr changes of pressure at Aas and Spitsbergen, shown by harmonic analysis of the solar rotation cycle of 27 days. A certain amount of persistence of amplitude and phase appears, which agrees with sequences of magnetic disturbance, and is probably due to especially strong radiation from the M-region, but the statistical probability of the reality of the pressure changes is not very high. *Subject Headings:* **1. Pressure variations 2. Solar rotation.**

8A–67 551.513.7:523.746

Hanzlík, S., **Die Schwankungen der atmosphärischen Zirkulation und die Sonnentätigkeit.** [The oscillations of the atmospheric circulation and solar activity.] *Beiträge zur Geophysik*, 50:264–270, **1937.** 2 figs., 2 tables. English summary p. 264. **DLC**—Deviations from average pressure differences between a large number of pairs of stations, Dec.–Feb. and June-Aug. are tabulated for successive sunspot cycles beginning 1855–1911. The signs change in alternate sunspot cycles, indicating a 22-year oscillation. Two opposite types (+, −, + . . . and −, +, − . . .) are distinguished and their distribution plotted on world maps. They indicate a "see-saw" between the North Atlantic and trade wind region on the one hand and the monsoon region on the other. *Subject Headings:* **1. Atmospheric circulation anomalies 2. Sunspot cycles.**

1943

8A–68 551.515.13:523.74

Kullmer, C. J., **A remarkable reversal in the distribution of storm frequency in the United States in the double Hale solar cycles, of interest in long-range forecasting.** *Smithsonian Miscellaneous Collections*, 103(10), **1943.** 20 p. 27 figs. **DWB**—Annual frequencies of centers of depressions in the U. S. 1874–1940, by cells of $2\frac{1}{2}°$ lat., 5° long. are discussed, by groups of 3 years about each sunspot maximum and minimum. The differences show an alternation of two patterns (3 bands of maximum difference; J-shaped band), each pattern persisting for two sunspot cycles. Appended charts show frequencies of storm centers and differences between maximum and minimum years, 1931–1940. Application to long range forecasting not clear. (*Same item as* 2B–179, Feb. 1951, *MAB.*) *Subject Headings:* **1. Cyclone tracks 2. Sunspots.**

8A–69 551.543:523.746

Schell, I. I., **The sun's spottedness as a possible factor in terrestrial pressure.** *American Meteorological Society, Bulletin*, 24(3):85–93, March **1943.** 2 figs., 5 tables, 15 refs. **DWB**—Periods of strong and weak sunspot activity since 1882 are arranged in order of duration (34–5 months) × Spottedness (above 80 and below 5 for at least 3 consecutive months). Pressure deviations in Dec.–Feb. at a number of stations in low and high latitudes are tabulated (1902–1940) and relative difference $\Delta p/\sigma p$ between means of high and low latitude pressure plotted against sunspot index. This shows a range from +3.4 in years of highest sunspot index to −3.6 in years of lowest sunspot index. *Subject Headings:* **1. Pressure variations 2. Sunspot activity.**

1945–1948

8A–70 551.555.9:523.746(495)

Karapiperis, Leon, **Sur la fréquence et la périodicité des étésiens à Athènes.** [On the frequency and periodicity of the etesians at Athens.] *Akademia Athēnōn, Praktika*, 20:126–134, 1945, pub. **1948.** 2 figs., 4 tables, 17 refs. In Greek; French summary p. 133–134. **DLC**—The main period of etesian winds is from mid-July to nearly the end of Aug. The number of days is closely related to the sunspot number, having a maximum of 70–90 at spot maximum and a minimum of 10–40 at spot minimum. The correlation coefficient (1893–1939) is +0.634. *Subject Headings:* **1. Etesian winds 2. Sunspot cycles 3. Greece.**

8A–71 551.590.21:551.515:550.342

Bernard, Pierre, **Répercussions de l'activité solaire sur les phénomènes terrestres.** [Repercussions of solar activity on terrestrial phenomena.] *Ciel et Terre*, 61:81–94, **1945.** 12 figs., 25 refs. **DLC**—Solar eruptions and sunspot numbers are compared with geomagnetic variations, reflections from F and E layers of the ionosphere, and microseismic activity, which are probably related to the frequency of cyclonic disturbances. Clouds due either to condensation or sandstorms, on Mars are most frequent when the earth's atmosphere is also strongly disturbed (maxima of storms in N. Atlantic and microseisms in Scotland). *Subject Headings:* **1. Solar influences 2. Atmospheric disturbances 3. Microseisms.**

8A–72 551.590.21:551.543.3(910)

Berlage, H. P., Jr., **Sunspot-numbers and air-pressure deviations in the Netherlands Indies.** *Indonesia.* (K.) *Magnetisch en Meteorologisch Observatorium te Batavia, Verhandelingen*, No. 31, **1947.** 15 p. fig., 3 tables, 9 refs. **NNA**—Author suggests that a three-year cycle in air pressure, prominent in the Netherlands Indies, is distorted by solar activity and discusses variations. Empirical rules to deduce the series of high- and low-pressure years in the Netherlands Indies from the mean yearly sunspot numbers are formulated, which leave only a few exceptions. (*Same item as* 5B–242, Feb. 1954, *MAB.*) *Subject Headings:* **1. Pressure variations 2. Sunspots 3. Indonesia.**

8A–73 551.515.23:551.590.21

Abbot, C. G., **Solar variation attending West Indian hurricanes.** *Smithsonian Miscellaneous Collections*, 110(1), **1948.** 7 p. fig., 3 tables. **DLC**—Solar constant values for 63 major hurricanes, 1923–1946, from 10 days before first report to 12 days after, were tabulated. Average result was a fall from 1.9479 ten days before to 1.9461 two days before and 1.9422 on the day of the hurricane, followed by a quick rise to 1.9468 three days later. (*Same item as* 2.4–78, April 1951, *MAB.*) *Subject Headings:* **1. Hurricane forecasting 2. Solar constant during hurricanes.**

8A–74 551.543:551.590.21:551.510.535

†Duell, B. and Duell, G., **The behavior of barometric pressure during and after solar particle invasions and solar ultraviolet invasions.** *Smithsonian Miscellaneous Collections*, 110(8), **1948.** 34 p. 21 figs., 53 refs. **DLC**—The *n*-method is applied to daily values of solar eruptions, ionospheric storms or geomagnetic character figures, and surface pressures for a number of stations. The period used was 1906–37. In Europe pressure falls by 1–3 mb for about 4 days following an ionospheric storm, the greatest deficit occurring after 2 days in N.W. Russia. This is followed 4–8 days after the storm by a rise over Scandinavia. A number of hypotheses have been made to explain this, all starting with solar eruptions; these are shown diagrammatically. Sea-level pressures in W. Europe and 500 mb surface topography following a number of intense ultraviolet radiation invasions and calcium flocculi are plotted. These invasions originate near sunspot groups at a certain stage of development and are accompanied by various geomagnetic and ionospheric phenomena. The absorption of the ultraviolet photons in the high atmosphere causes dissociation and production of condensation nuclei. The effects are very complicated, as shown by another diagram, but lead ultimately to a temporary influence on the stratospheric-tropospheric circulation and large-scale weather processes. When a sufficiently reliable solar observation service is available, the relations may be of use in forecasting. *Subject Headings:* **1. Pressure variations 2. Solar influences 3. Ionospheric storms.**

1950–1953

8A–75 551.513:551.583.1:523.74

Scherhag, Richard, **Betrachtungen zur allgemeinen Zirkulation. I. Teil. Die Schwankungen der allgemeinen Zirkulation in den letzten Jahrzehnten.** [Remarks on the general circulation. Pt. I. The variations of the general circulation in the last decades.] *Germany. Deutscher Wetterdienst in der U. S. Zone, Berichte*, No. 12:40–45, **1950.** 5 figs., 3 tables, 6 refs. Summaries in German and English p. 40–41. **MH-BH**—World charts show change of mean pressure and mean temperature 1921–40. Pressure rose in high latitudes and fell in low latitudes. Zonal changes are shown by decades since 1886 and sunspot cycles since 1875. The strengthening of the general circulation which had extended from 1886–1930 ceased in 1931–40. Nevertheless temperature continued to rise over much of the world, especially Europe and the U. S. (*Same item as* 9–57, Sept. 1950, *MAB.*) *Subject Headings:* **1. General circulation 2. Climatic variations 3. Sunspot effects.**

8A–76 551.543:551.510.534:551.590.21

Wexler, Harry, **Possible effects of ozonosphere heating on sea-level pressure.** *Journal of Meteorology*, 7(6):370–381, Dec. **1950.** 8 figs., table, 24 refs., 18 eqs. **MH-BH**—The author discusses the hypothesis that large scale weather anomalies in the Northern Hemisphere are of extraterrestrial origin and are the result of rapid heating or cooling of the ozonosphere by variable ultraviolet radiation of the sun and consequent variations in the sea level barometric pressure. In order to determine whether transfers of mass accompany the readjustment processes of thermally produced pressure gradients two mathematical models are postulated, namely: 1) a single layer homogeneous atmosphere on a plane rotating earth and 2) a two-layer atmosphere. Pressure changes resulting from assumed amounts of heating are computed for both models; and in the case of the second more realistic model the effect of sudden heating of the ozonosphere produces an insignificant change in sea level pressure. An analysis of a forty year series of daily Northern Hemisphere sea level maps was made in order to determine whether periods of sunspot maxima or minima influence the meridional profile. There is evidence that there is an excess of pressure at higher latitudes

during sunspot maxima, but the differences in the pressure profiles are small and random. (*Same item as* 2.3–102, March 1951, *MAB.*) *Subject Headings:* **1. Pressure variations 2. Solar influence 3. Ozonosphere.**—*I.L.D.*

8A–77 551.590.2

Flohn, Hermann, **Solare Vorgänge im Wettergeschehen.** [Solar processes in weather phenomena.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A,* 3(3/4):303–329, 1951. 6 figs., 72 refs. German, English and French summaries p. 303–304. **MH-BH**—A summary of relations between various weather elements and the 11-year sunspot cycle leads to the general conclusion that high solar activity is accompanied by weakened zonal and strengthened meridional circulation in high latitudes. The 5.6-year and 27-day cycles are also discussed. Author then examines connection between meridional passage of sunspots and daily thunderstorm frequency in Germany and finds increased frequency on following 3 days (rather indefinite). There is some agreement between daily thunderstorms and magnetic disturbance. Relations are discussed between pressure anomalies and 24-hour changes in Europe and magnetic disturbance in different phases of sunspot cycle. The meaning of these relations is discussed—UV or corpuscular radiation from solar eruptions—with various theories of the mechanism. (*Same item as* 3.1–170, Jan. 1952, *MAB.*) *Subject Headings:* **1. Solar phenomena 2. Sunspot cycles 3. Germany 4. Europe.**

8A–78 551.543.3(266):551.590.2

Berlage, H. P., **Solar activity and air pressure fluctuations over the South Pacific ocean.** *International Union for Geodesy and Geophysics. Association of Meteorology, Brussels, 1951, Procès Verbaux des Séances, Mémoirs et Discussion,* pub. **1953.** p. 107–112. fig., 2 eqs. **DWB, DLC**—Pressure variations in the S. Pacific are related through air temperatures to variations of sea temperatures propagated by the tropical oceanic circulation. When this is weakened heating of the South Equatorial Current is rapid, but cooling requires the transport of cold polar water from far off, giving a "saw-tooth" variation. In the Malay low and Easter Island high, and perhaps through the whole tropical and subtropical zone of the Pacific, air pressure is low during great solar activity and high during weak solar activity. Increased eruptive solar activity primarily raises air temperature in the tropics, but this brings in the compensating effect of increased convective cloudiness and precipitation. This lowers the temperature in cloudy regions but not in cloudless regions such as Easter Island. (*Same item as* 7.2–172, Feb. 1956, *MAB.*) *Subject Headings:* **1. Pressure variations 2. Solar influences 3. South Pacific.**

8A–79 551.543:523.74(481)

Nordø, Jack, **A statistical discussion of a possible connection between solar activity and sea level pressure.** *Norske Videnskaps-Akademi i Oslo. Institutt for Vaer- og Klimaforskning, Publication,* No. 2, **1953.** 41 p. 2 figs., 24 tables, 23 refs., 70 eqs. Mimeo. **DWB**—Statistical tests of significance are described and probability of chance occurrence $\geqslant 5\%$ is adopted as indicating a real relationship. Persistence of daily pressures is examined by autocorrelation, r for successive days being about 0.7. Sample days are selected to eliminate persistence. To obtain nondimensional figures, pressure deviations are divided by their standard deviations. Chromospheric eruptions (flares) in relation to sunspots are next discussed. After an elaborate analysis no evidence is found that strong isolated flares influence interdiurnal changes of sea level pressure in southern Norway. The positive relation found by B. and G. Duell (1948) is attributed mainly to chances of sampling but there does seem to be some external influence on sea-level pressure in the two days following the key days. Papers by B. Valnıček (1952), R. A. Craig (1952), H. Flohn (1951), H. Wexler (1951) and F. Baur (1951) are also critically discussed. (*Same item as* 6.1–190, Jan. 1955, *MAB.*) *Subject Headings:* **1. Pressure variations 2. Solar activity 3. Norway.**

1955–1956

8A–80 551.509.52:629.13:523.75

Farthing, E. D., **Solar activity-weather research: Flight time forecasts, TWA Flight 38.** *Trans World Airlines, Inc., K. C., Missouri, System, Meteorological Bulletin,* No. 55–1, Jan. 4, **1955.** 2 p. tables. **DWB**—During Dec. 1954, trial forecasts of flight time for TWA flight 38 were made on the basis of the theory that an over-all intensification of the westerly flow begins about 2–3 days prior to a solar coronal emission maximum, and that the date and magnitude of the increase depend on the magnitude of the coronal maximum. In all, 46 forecasts were made, and the statistics of verification presented, showing 69–77% correct trends for 1, 2 and 3 day forecasts, whereas MKCW forecasts averaged 65% correct. *Subject Headings:* **1. Airways forecasting 2. Sun's corona emissions 3. Upper air wind forecasting.**—*M.R.*

8A–81 551.509.33:551.524.37:551.590.21

Faust, H., **Über den kalten Februar 1956.** [Cold February 1956.] *Naturwissenschaftliche Rundschau*, Stuttgart, 9(5):190–200, May **1956. DWB**—Long range forecasters in Germany predicted a mild winter in 1955/56, but in Feb. weather turned very cold. This was due to a change from zonal to meridional circulation, which according to F. BAUR followed a decrease of sunspot number from 156 on Nov. 11 to 32 on Jan. 10. This probably caused a decrease of ultraviolet radiation and a fall of temperature in the ozone layer. (*Same item as* 7.10–107, Oct. 1956, *MAB.*) *Subject Headings:* **1. Severe winters 2. Long range forecasting 3. Solar influences 4. Germany.**—*C.E.P.B.*

8A–82 551.513:551.590.21:523.746

Rodewald, Martin, **Schwankungen der Sonnenfleckentätigkeit und Luftdruckschwankungen im Raume Europa-Nordatlantik (1–2 Mitt.).** [Variations of sunspot activity and pressure oscillations in the Europe-N. Atlantic region.] *Annalen der Meteorologie*, 7(3–4):186–212, **1955–56.** 2 figs., 2 tables, 21 refs. German and English summaries p. 186, 201. **DWB**—Zurich daily sunspot numbers *R* smoothed over 5 days in 1947 were compared with smoothed daily pressures in 60°N 0°W and temperatures in Hamburg, and a fairly close agreement was found with a lag of about 4 days in pressure and 5–8 days in temperature. Pressure changes accompanying increases of *R* were then mapped; in winter 1947 there was a great rise centered to N.W. of British Isles and in summer a pressure fall west of Europe and a rise over the Baltic. At *R* maxima there was an anticyclone over central Europe, at *R* minima a depression to the N.W. extended over Europe. In 1948 conditions were quite different; marked increase of *R* gave a fall of pressure over Scandinavia in spring and N.W. of Ireland in summer but in winter a marked rise of S. of Iceland. The second part deals with 1949–54. As in 1948, on the average with rising *R* pressure rose in the subtropical high and fell in the subpolar low; Azores-Iceland gradient increased by 35%. Thus 1947 was exceptional. An editorial note describes changes accompanying rising *R* in 1955. *Subject Headings:* **1. Sunspot effects 2. Atmospheric circulation 3. Europe.**—*C.E.P.B.*

8A–83 551.513:523.75

Riehl, Herbert, **On the atmospheric circulation at 500 mb in the auroral belt.** *Journal of Geophysical Research*, Wash., D. C., 61(3):525–534, Sept. **1956.** 5 figs., 8 refs., 3 eqs. **DLC.** Also in: Chicago Univ. Dept. of Meteorology, Contract N6ori-02036, Project NR 082-120 Report on Research (unnumbered), May **1956.** 13 p. 5 figs., 8 refs., 2 eqs. **DWB**—A study of the 500 mb circulation in the Arctic auroral belt during Dec. 1954–June 1955 (a period near the 1954 sunspot minimum) was made to determine whether or not the corpuscular streams from the solar flares would produce appreciable changes in the general circulation (as shown by changes in the mechanical momentum convergence). No relationship was found between solar flares and changes in the general circulation, but a period corresponding to the solar rotation period was noted. The auroral belt is eccentric to the geographic pole—hence the momentum convergence equation had to be set up in a spherical coordinate with an eccentric pole. *Subject Headings:* **1. Solar—500 mb circulation relations 2. Momentum convergence 3. Auroral zones.**—*M.R.*

8A–84 551.543:550.385

Shapiro, Ralph, **Further evidence of a solar-weather effect.** *Journal of Meteorology*, 13(4):335–340, Aug. **1956.** 9 figs., table, 15 refs. **DWB**—Changes of successive 3-day means of surface pressure, 1899–1945, at 91 points in 30–60°N, 65–125°W, represented by 14 orthogonal polynomials, are autocorrelated for 12 days before to 19 days after days of large increase of geomagnetic character figures. Persistence correlation reaches a maximum 3–4 days and a minimum 14 15 days later. Tests show that the relations are real. They are attributed to increases of corpuscular radiation from the sun, causing heating in the auroral rings. *Subject Headings:* **1. Pressure variations 2. Geomagnetic disturbance effects.**—*C.E.P.B.*

4. RAINFALL, RIVER AND LAKE LEVELS

1923

8A–85 551.579.4:523.74

Brooks, C. E. P., **Variations in the levels of the Central African lakes Victoria and Albert.** *Great Britain. Meteorological Office, Geophysical Memoirs*, 2(20):337–344, **1923.** fig., 7 tables. **DWB**—Means of maximum and minimum readings of lake gages at Kisumu, Lake Victoria, 1896–1921 and rainfall of Uganda are correlated with monthly sunspot numbers. The partial correlation lake levels-sunspots (rainfall eliminated) is +.72, lake levels-rainfall (sunspots eliminated) only −.25, showing that evaporation is more important than rainfall in determining lake level. For

1902–1921, for which the data are more reliable, the figures are +.82 and +.39. Level of Lake Albert also agrees with sunspot numbers. *Subject Headings:* **1. Lake level variations 2. Sunspots 3. Lake Victoria, Africa.**

1928

8A–86 551.579.4(62):523.74

Brooks, C. E. P., **Periodicities in the Nile floods.** *Royal Meteorological Society, Memoirs*, 2(12), **1928.** 26 p. 3 figs., 4 tables. **DWB**—A series of Nile flood data AD 641-1451 was investigated by the "Difference periodogram" and harmonic analyses of nineteen periodicities were found ranging from 2.177 to 77 years, of which 13 bore a simple relation to the 22.12 year periodicity. All these varied systematically in length over a major cycle of about 500 years; e.g., the 22 year periodicity ranged from 22.43 to 21.81 years. Closer examination shows that this 500 year cycle is made up of two components of 450 and 520 years. A note is added of similar periodicities in recent solar and meteorological data. *Subject Headings:* **1. Nile floods 2. Solar cycles.**

1936

8A–87 551.577.33:523.746

Hanzlík, S., **Der Niederschlagseffekt der Sonnenfleckenperiode.** [The precipitation effect of sunspot periods.] *Beiträge zur Geophysik*, 47(1/2):15–30, **1936.** 5 figs., 15 tables, German and English summaries p. 15–16. **DWB, DLC**—The rainfall data in **World Weather Records** were studied by plotting the differences: 3 years about sunspot minimum minus 3 years about spot maximum. Three types are distinguished, the simple sunspot cycle (maximum at spot maximum *or* minimum), the 22-year (Hale) sunspot cycle, and the combined 16 and 6 year cycles which causes regular changes of the sign of the relation to the sunspot cycle. World maps of the distribution of these types in each season are given. *Subject Headings:* **1. Precipitation variations 2. Sunspot cycle.**

1938

8A–88 551.577.33:551.590.21

Quayle, E. T., **Australian rainfall in sunspot cycles.** *Australia. Meteorological Branch, Bulletin*, No. 22, **1938.** 56 p. fold. map, 3 tables, refs. **NNA**—Elaborating on his original paper (*Royal Society of Victoria, Proceedings*, 37(2):131–143, **1925**), in which he pointed out that in the Australian area the response to changes in solar activity as indicated by the sunspot numbers differed in phase throughout the continent, the author now distinguishes between responses of summer and winter seasons and shows how far successive cycles approximate mean relationships in phase and amplitude. Tables show average summer and winter rains in sunspot cycles and variations from average summer and winter rains in sunspot cycles at various stations. (*Same item as* 4D–96, April 1953, *MAB.*) *Subject Headings:* **1. Precipitation variations 2. Cycles 3. Sunspot effects 4. Australia.**

1945

8A–89 551.577.33:523.74(764,766)

Bollinger, Clyde J., **The 22-year solar pattern of rainfall in Oklahoma and Kansas.** *American Meteorological Society, Bulletin*, 26(9):376–383, Nov. **1945.** 2 figs., 4 tables, 11 refs. **DWB**—A "solar index" was devised to represent the variations of solar radiation in the Hale sunspot cycle. Values are given for 1886–1943; 4 maxima appear in each 22 years. The annual rainfall totals for Oklahoma and Texas are plotted against these, showing a correlation of +0.82. *Subject Headings:* **1. Rainfall periodicities 2. Solar cycle 3. Oklahoma 4. Texas.**

1949

8A–90 551.579.4:523.74

Steinhauser, F., **Ergänzung zur Mitteilung über die Sonnenflecken und die Seespiegelschwankungen des Viktoriasees.** [Completion of communication on sunspots and variations of level of Lake Victoria.] *Wetter und Leben*, 1(12):357–359, March **1949.** 2 figs. **MH-BH**—Correlation of +.87 in 1899–1921 (*see* 8A–85) fell to +.31 in 1922–1943. (*Same item as* 6–79, June 1950, *MAB.*) *Subject Headings:* **1. Lake level variations 2. Sunspots 3. Lake Victoria, Africa.**

1952–1953

8A–91 551.509.33:551.521.1:551.577.33

Abbot, Charles Greeley, **Solar variation and precipitation at Peoria, Illinois.** *Smithsonian Miscellaneous Collections*, 117(16), Sept. 3, **1952.** 18 p. 7 figs., 5 tables. **MH-BH**—Using 1000

months of data (1856–1939) for Peoria, Ill., and tabulating separately according to 20 or 30 supposed periods, a conclusion is drawn that a number of separate periodicities go to make up the 23-year cycle in rainfall at Peoria. On the basis of these, a 10-year prediction was made, 3 of the years being in advance. It is stated that "99 months out of 136 (1940 1950) show an average divergence of 15%, but the long range prediction is marred by changes of phase which thus far cannot be anticipated and allowed for in advance." The most remarkable correlations are shown in graphs and tables. (*Same item as* 5.7–60, July 1954, *MAB.*) *Subject Headings:* **1. Solar influences 2. Precipitation cycles 3. Periodicities 4. Peoria, Illinois.**—*M.R.*

8A–92 551.509.33:551.577.33:551.521.1

Abbot, Charles Greeley, **Solar variation and precipitation at Albany, N. Y.** *Smithsonian Miscellaneous Collections*, 121(5), Jan. 27, **1953.** 16 p. 6 figs. (some fold.), 3 tables, refs. **DLC**—Author found that solar radiation varies in 23 periods, aliquot parts of 272 months. "No scientific knowledge of meteorology" would be necessary in order to predict march of precipitation years in advance, combining periods by synthesis. Data for the period 1850–1939 for Albany were used for the analysis. Results obtained by extensive "shifting of phases." Test prediction for 1940–1952 does not show any agreement. (*Same item as* 5.7–59, July 1954, *MAB.*) *Subject Headings:* **1. Precipitation cycles 2. Solar influences 3. Albany, N. Y.**—*A.A.*

8A–93 551.590.21:551.577(437)

*Křivský, L., **Dlouhodobé kolísaní ročních srážek v Praze-Klementinu v období 1805–1951 a ve vztahu k sluneční činnosti.** [The long-range variability and annual precipitation in Prague-Klementinum in the period 1805–1951 and in relation to the solar activity.] *Ondrejov. Astrofysikální Observatoř, Publikace*, No. 23:37–72, **1953.** 7 figs. (1 fold.), table, 43 refs. In English; Russian summary p. 69–72. **DWB**—Precipitation data for Prague from 1805 to 1951 are homogenized, smoothed and analyzed to show the secular trend or cycles. These are shown graphically in relation to WILLETT's cycles, and a forecast made for the period 1955–2000 A.D. If solar-precipitation relations persist, there should be a minimum of precipitation in the next decade, a rise to a maximum from 1970–1990, and a decline at the end of the century. The theory is that (in Central Europe) precipitation declines immediately after a maximum of EIGENSON's sunspot recurrence index, and vice versa. *Subject Headings:* **1. Solar-precipitation relationships 2. Long period precipitation records 3. Long range precipitation forecastings 4. Prague-Klementinum, Czechoslovakia.**—*M.R.*

8A–94 551.590.21:551.577(73)

Mauchly, John W. (*Eckert-Mauchly Div., Remington Rand Inc.*), **Evidence for effects of day-to-day solar variations on weather.** Rev. digest of paper presented April 30, 1953 before the American Meteorological Society meeting in Washington, D. C. (Climatology Session). 6 p. tables. Mimeo. **DWB**—Mean ratio of average precipitation over North America on solar disturbed days to the mean on all days, computed for 48 months, is 9.2% below unity, which is 3.05 times the standard deviation expected by chance. Combining the deviation with similar ratios for wind speed at single stations, and applying HOTTELING's "T" test, a still higher significance level was found. (*Same item as* 5.1–297, Jan. 1954, *MAB.*) *Subject Headings:* **1. Solar influences 2. Precipitation 3. United States.**—*A.A.*

1955–1956

8A–95 523.755:551.577.3(747)

Farthing, E. D., **Precipitation at New York City as related to solar coronal activity.** *Trans World Airlines, Inc., K. C., Mo., TWA Meteorological Technical Bulletin*, No. 55–9, Nov. 30, **1955.** 2 p. figs. **DWB**—Strong solar coronal activity (high green/red ratio) correlated highly (positive) with heavy precipitation at New York during period Nov. 3, 1954–Oct. 31, 1955. *Subject Headings:* **1. Solar weather relationships 2. Solar coronal green/red ratio 3. Precipitation-solar activity correlation 4. New York, N. Y.**—*M.R.*

8A–96 551.577.33:523.746

Karapiperis, Leon N., **The rainfall of the Mediterranean region in relation to solar activity.** *Akademia Athenon, Praktika*, 30:391–402, **1955.** 9 figs., table, 19 refs. In English, Greek summary p. 401. **DLC.** *Repr. as:* Athens. *Panepistemion. Ergasterion Meteorologias, Demosieumata*, Publ. No. 3, **1955.** Also in: *I.U.G.G. Association of Meteorology, Rome, Sept. 1954, Scientific Proceedings.* London, Butterworth, **1956.** p. 139–140. **DWB**—The influence of sunspot cycles on the annual, winter and summer rainfall is examined at 35 stations in the Mediterranean. In the annual rainfall 3 types are found: (a) Single maximum at or 1–2 years after spot maximum; (b) Double oscillation with the principal maximum near spot maximum and the principal minimum near spot minimum, a variety (b1) has the principal maximum and minimum on either side of the spot

maximum; (c) Three maxima in the sunspot cycle. In the winter rainfall rather similar types appear but 79% of the stations are characterized by type (b). In summer however the variation is opposite, spot maximum being either the principal or (in a few cases) a secondary *minimum* of rainfall. This is attributed to the inverse relation between summer thunderstorms and sunspots. The stations belonging to each type are listed. (*See also* 6.2–259, Feb. 1955, *MAB.*) *Subject Headings:* **1. Rainfall variations 2. Sunspot cycles 3. Mediterranean region.**

8A–97 551.590.21:551.577

Peisino, Giovanni (*Collurania, Italy*), **Attività solare, eliofania e precipitazione differenziale (diurno-notturna) a Collurania nel trentennio 1925–1954.** [Solar activity, sunshine and precipitation differences (day-night) at Collurania during the 30-year period 1925–1954.] *Geofisica e Meteorologia,* Genoa, 4(1/2):8–10, Jan./April **1956.** fig., 2 tables. **DWB**—Variations of the difference between day and night-time precipitation values are found to agree with solar activity variations (1925–1955), suggesting a solar effect on precipitation through the medium of atmospheric ionization. *Subject Headings:* **1. Solar influences 2. Precipitation variations 3. Collurania, Italy.**—*G.T.*

5. CLOUD, THUNDERSTORMS, ATMOSPHERIC ELECTRICITY

1924–1926

8A–98 551.594.11:523.746

Bauer, Louis A., **Correlations between solar activity and atmospheric electricity.** *Terrestrial Magnetism and Atmospheric Electricity,* 29:23 32, 161–186, March, Dec. **1924.** 6 figs., 14 tables, footnote refs. **DLC**—Potential gradient and its diurnal and annual range on electrically quiet days in 1901–23 and also 1845–1913 (7 sunspot cycles) show general parallelism with sunspot relative numbers in 5 cycles, the increase being 20–35% for an increase of the 100 in the sunspot number. The average correlation is 0.75 but it varies from cycle to cycle. During two cycles, centered about 1855 and 1889 however, a reverse relation held. In 1893, when spottedness was a maximum, the decrease of the electrical quantities was most significant. The air-earth current is also subject to sunspot influence, but it could not be determined whether the conductivity is affected. *Subject Headings:* **1. Potential gradient variations 2. Sunspot cycles.**

8A–99 551.594.11:523.74

Bauer, Louis A., **Regarding atmospheric electricity and its relation with solar activity.** *Terrestrial Magnetism and Atmospheric Electricity,* March **1925**:17–23. table, 13 refs. Abstracted from reprint. **DLC**—Comparison of Potsdam data of potential gradient, P 1913–23 on electrically undisturbed days and the sunspot relative number S shows that P increased approximately 3% for an increase of 10 in S. This is in accord with results at some other stations. Some earlier observations show possible reversals in this relation. *Subject Headings:* **1. Potential gradient variations 2. Solar activity.**

8A–100 551.515.4:523.746

Septer, Evald, **Sonnenflecken und Gewitter in Siberien.** [Sunspots and thunderstorms in Siberia.] *Meteorologische Zeitschrift,* 43(6):229–231, **1926.** fig., table. See also *Meteorological Magazine,* London, 61:216, **1926. DLC**—Annual numbers of thunderstorm days for 229 stations between 71° and 43°N, 59½ and 149½°E are tabulated for 1888–1924. The annual averages range from 7.6 to 19.7 (*see* 8A–6) and show a remarkably high correlation with sunspot relative numbers. The 55.6 year sunspot periodicity is probably also present in thunderstorm frequency, but the observations do not go back far enough to show this with certainty. *Subject Headings:* **1. Thunderstorm variations 2. Sunspot activity.**

1933–1938

8A–101 551.590.21:551.593.63

Archenhold, Gunter, **Eine 27 tägige Periode der Halohäufigkeit.** [A 27-day period of halo frequency.] *Beiträge zur Geophysik,* 39:141–143, **1933.** fig., 2 tables. **DWB**—The relation between halo frequency and sunspots is complex. Halo observations at Berlin 1926–1931 show a well marked 26–28 day periodicity. *Subject Headings:* **1. Solar influences 2. Halo periodicities.**

8A–102 551.515.4:523.746

Brooks, C. E. P., **The variation of the annual frequency of thunderstorms in relation to sunspots.** *Royal Meteorological Society, Quarterly Journal,* 60(254):153–162, April **1934.** fig., 5 tables. Discussion, p. 162 165. **DWB**—Annual thunderstorm frequencies were tabulated as far as possible for 1866–1932 for numerous stations in Siberia, Norway, Sweden, British Isles, Holland, Germany, Japan, U. S., West Indies, Southern Asia, Tropical Pacific, Australia and New Zealand, and the

annual totals were expressed as percentage of average for each area. Several thousand stations in all were used. The crude figures and those corrected for secular change were correlated with sunspot numbers in the same years. Coefficients were nearly all positive, the highest values occurring in high or low latitudes (Siberia and inland Sweden; West Indies, Southern Asia and Tropical Pacific). The data were then harmonically analyzed for an $11\frac{1}{2}$ year period and the difference in phase between the sunspot and thunderstorm cycles calculated. In Siberia and inland Sweden the phase difference is very small, but in tropical oceanic regions thunderstorms lag 5 months behind sunspots. For the whole world the amplitude of the thunderstorm variation in the sunspot cycle is 11% either side of the mean. In the discussion F. J. W. WHIPPLE pointed out that the phase of the sine wave of potential gradient at El Ebro agreed within a year with the annual variation of sunspots over the world, and the amplitude (9%) was also concordant. *Subject Headings:* **1. Thunderstorm activity 2. Sunspot cycles.**

8A–103 551.593.63:523.74:550.38

Neuberger, Hans, **Über die Beziehung zwischen der Sonnentätigkeit und dem Auftreten von Haloerscheinungen.** [On the relation between solar activity and halo phenomena.] *Beiträge zur Geophysik*, 51:343–364, **1937.** 7 figs., 14 tables, 20 refs. German and English summaries p. 343. **DLC**—The correlation between halos and solar activity bears on the effect of solar corpuscular radiations on condensation processes in the upper troposphere. Halo phenomena are most frequent at equinoxes and least frequent at solstices. ARCHENHOLD's 27-day periodicity of halos is not confirmed. A weak negative correlation is found between 10-day and monthly halo frequency H and magnetic character figures E and sunspot relative numbers S. Consideration of the daily frequencies (n-method) shows that halo maxima occur one day later than maxima in E on quiet days or minima on disturbed days, and maxima in H occur 3 days after maxima in S, but the relations are rather indefinite. *Subject Headings:* **1. Halo frequencies 2. Solar activity 3. Geomagnetic activity.**

8A–104 551.593.63:523.746

†Archenhold, G., **Untersuchungen über den Zusammenhang der Haloerscheinungen mit der Sonnentätigkeit.** [Investigations of connection of halo phenomena with solar activity.] *Beiträge zur Geophysik*, 53:395–475, **1938.** 9 figs., 26 tables, 56 refs. German and English summaries p. 395–396. **DLC**—This elaborate memoir analyzes the author's halo observations at Berlin, 1926–1936, in great detail. The effects of annual variation and lower cloud are studied and eliminated. The 12 monthly figures of halo frequency H and sunspot relative number R for each year are then found to give a mean increase of halos with increasing R of $+0.041 \pm 0.020$ R which is much less close than the relation between R and magnetic activity. Observations by MOISSEIEFF in Moscow, 1917–1934, gave $+0.059 \pm 0.013$ R; combination of the two gave $+0.054 \pm 0.011$ R. From an examination of the monthly values it is concluded that there is a positive primary relation and a contrary secondary effect. The solar rotation periodicity is next investigated, and from 73 years of observation by 7 observers a mean periodicity of about 28 days is found, probably real. Finally, the relations of daily halo frequency to daily relative numbers, magnetic character figures, strong chromosphere eruptions and the passage of active regions through the central meridian of the sun, both synchronous and with a lag, are investigated but no definite connections were found. *Subject Headings:* **1. Halo frequencies 2. Sunspot numbers.**

1951

8A–105 551.515.4:523.75

Flohn, H., **Solare Korpuskularausbrüche und Gewitterfrequenz.** [Solar corpuscular outbreaks and thunderstorm frequency.] *Probleme der Kosmischen Physik*, 25:143–149, [**1951?**]. 2g., table, 11 refs. German and English summaries p. 143.—"In years of moderate or little solar activity, the thunderstorm frequency for days with a major sunspot, or sunspot group, passing the central meridian of the sun will rise by approximately 20% in Central and Northern Europe, and in the average will continue to remain above normal for another 3 days. The physical relationship seems to consist of an anomalous ionization of the higher layers of the troposphere by streams of solar corpuscles." *Subject Headings:* **1. Solar eruptions 2. Thunderstorm activity.**—*Author's abstract.*

SUPPLEMENTARY MATERIAL

8A–106 551.590.21(02)

Berg, Hellmut, **Solare Einflusse auf das Wetter.** [Solar influence on weather.] (In his: **Atmosphare und Wetter.** Stuttgart, Humboldt-Verlag, **1953.** p. 301–309. 4 figs.) **DLC**—This chapter summarizes the present status of knowledge on solar influences on weather. Works of

Abbot, Arctowski, Dull, Rudloff and others on the relations of sunspots or faculae to the general circulation, temperature or precipitation are stressed. *Subject Headings:* **1. Solar influences on weather 2. Textbooks.**—*M.R.*

8A–107 551.582 551.524.33:523.74(437)

Berkes, Zoltan, **A hőmérséklet napközi változékonysága Budán, 1855–1955.** [Interdiurnal variability of air temperature at Buda, 1855–1955.] Beszámolók az 1955-ben végzett tudományos kutatásokról, Budapest, p. 120–128, **1955.** 2 figs., 2 tables, 3 refs. Russian and French summaries p. 120. **DWB**—Values of average interdiurnal temperature variability (the average change of mean temperature from one day to the next) at Budapest are tabulated for every month of the period 1855–1955. A correlation is found to exist between long-period (80-year) variations of solar activity and interdiurnal temperature variability. This correlation is positive up to 1880 and negative thereafter. A similar correlation between 11-year sunspot cycle and interdiurnal temperature variability is found to be negative up to 1880 and positive since that date. No explanation has been found for this sudden shift in signs of solar activity—temperature variability relationships. *Subject Headings:* **1. Sunspot effects on temperature 2. Interdiurnal temperature variations 3. Climate of Hungary 4. Budapest, Hungary.**—*G.T.*

8A–108 551.577.33:523.74

Németh, Tivadar, **A csapadék hullámzása Budapesten.** [Precipitation fluctuations at Budapest.] Beszámolók an 1955-ben végzett tudományos kutatásokról, Budapest, p. 214–219, **1955.** 2 figs., 3 tables, eqs. Russian and German summaries p. 214. **DWB**—Intermittent appearance of an $8\frac{1}{2}$-month periodicity in average rainfall at Budapest is attributed to a combined effect of sunspot cycle and prevalence of Mediterranean climate. *Subject Headings:* **1. Sunspot effects on precipitation 2. Precipitation periodicities 3. Climate of Hungary 4. Budapest, Hungary.**—*G.T.*

8A–109 523.746:551.524.33

Sugawa, C., **Abnormally long-lived sunspot groups and 25-day period in air temperature.** *Journal of Meteorological Research*, Tokyo, 4(10):745–749, Feb. **1953.** fig., 3 tables, 6 refs. In Japanese; English summary p. 47. **MH-BH**—A series of long-lived sunspot groups Jan. 24–June 19, 1951, gave a regular 25-day periodicity in sunspot numbers. During this period, but not before or after, pressure (locality not clear) showed a double wave, main peak (+2.1 mm) 4 days before spot max; and temperature a minimum (−2.5°C) near spot max. *Subject Headings:* **1. Temperature periodicities 2. Sunspots.**

8A–110 551.590.21:523.746

Visser, S. W., **De invloed van de zonnevlekken op het weer.** [Effect of sunspots upon weather.] *Hemel en Dampkring*, 53(4):71–77, April **1955.** 5 figs., 2 tables. **MH-BH**—The relationship between the 27-day sunspot cycle and heat waves in Western Europe in 1947 established by the author is tested on the basis of temperature data in North America in 1947 and in 1953. It is shown that an ionospheric storm maximum occurs several days (17th day of cycle) after a sunspot maximum (13.5th day) and a temperature maximum (17 days) follows in Western Europe. In Washington, the temperature maxima occur on the 19th day and in the Pacific N.W. on the 7th–10th day. *Subject Headings:* **1. Sunspot effects on weather 2. Sunspot cycles.**—*I.L.D.*

8A–111 582.26:523.746

Walker, F. T., **Periodicity of the Laminariaceae around Scotland.** *Nature*, London, 177(4522): 1246, June 30, **1956.** fig., 2 refs. **DWB**—Aerial observations of seaweed on 6000 mi of Scottish coast, 1946–55, showed very close correlation with sunspot relative numbers. *Subject Headings:* **1. Seaweed variations 2. Sunspot effects.**

8A–112 551.590.21

Wexler, Harry, **A look at some suggested solar-weather relationships.** (In: Evans, John W.; Chapman, Sydney and Wexler, Harry, **The sun's effects on the earth's atmosphere.** *Climax, Colorado. High Altitude Observatory. Institute for Solar-Terrestrial Research, Technical Report*, No. 2:21–30, Oct. **1956.** 2 figs., 20 refs.) **DWB**—The author cites conflicting statistical evidence from previous studies to show the need for complex and realistic model studies of the downward or upward propagation of disturbances caused by local heating of discrete layers such as obtained in the ionosphere, ozonosphere or troposphere when sudden changes occur in the incoming radiant energy (e.g., during solar flares). Such models can only be treated by means of electronic computers, but simple models by Charney, the author and others, indicate that upward propagation of minor disturbances in the troposphere can occur radially, but downward propagation of a sudden warming, of say 10°C, in the ozonosphere would not produce a pressure change at the surface of any significance unless the heating processes were repeated at short intervals and were additive. Graphs for summer and winter, respectively, show pressure rises of about 1.0 mb in high latitudes and falls of the same order in mid latitudes 0 to 1, 0 to 2, or 0 to 3 days following SID's. Average pressure

differences between (3) years around sunspot maxima and sunspot minima (1899 1939) show almost the same latitudinal pattern. But an examination of profiles for individual sunspot cycles or cases makes the picture less impressive. The Berlin warming (SCHERHAG, 1952, 1953 and others) and ionospheric links with the general circulation (DUELL and others) may just as easily be explained as due to tropospheric effects on the stratosphere, ionosphere, or magnetic field (dynamo theory) as due to solar corpuscular effects propagated downwards. *Subject Heading:* **1. Solar-weather relationships.**—*M.R.*

8A–113 551.513:551.590.21

*Willett, Hurd C., **Monthly and seasonal circulation anomaly patterns in relation to sunspots.** Weather Services, Inc., Boston, Contract AF 19(604)-449, Scientific Report, No. 6, Aug. **1954.** 21 p. 6 tables, 2 refs. Mimeo. **MH-BH**—A statistical study based primarily on the sea level pressure anomaly pattern in the period 1899–1939, distinguishing between eight phases of the double sunspot cycle. The resulting anomaly charts are not shown. Care was taken to assess the statistical significance of these patterns, which was found to be rather low. *Subject Headings:* **1. Atmospheric circulation-sunspot relationships 2. Atmospheric circulation anomalies 3. Statistical studies 4. Northern Hemisphere. I. Weather Services, Inc., Boston II. Contract AF 19(604)-449.**—*A.A.*

8A–114 551.577:551.590.21(494)

Brunner-Hagger, William, **Beziehungen zwischen Sonnentätigkeit, komischer Strahlung, Meteorströmen und Zürcher Niederschlägen.** [Relations between solar activity, cosmic radiation, meteor streams and Zurich rainfall.] *Schweizerische Naturforschende Gesellschaft, Verhandlungen*, 135:112–113, **1955.** 4 foot-refs. **DWB**—The 40 to 62-day lag between maximum relative sunspot number and precipitation peaks at Zurich may be due to the speed of 29 to 43 km/sec with which solar corpuscular radiation propagates, or to a 40 to 60-day lag in the emission of such radiation. An example from 1943 would appear to support the first hypothesis while the relation between rainfall intensity and cosmic radiation tentatively identified at Jungfraujoch (1938) would favor the second hypothesis. The meteor dust effect on precipitation derived from worldwide data by E. G. BOWEN is confirmed by the Zurich precipitation series. *Subject Headings:* **1. Solar-precipitation relationships 2. Zurich, Switzerland.**—*G.T.*

8A–115 551.5:523.755

Farthing, E. D., **Solar-weather research.** *Trans World Airlines, Inc., K. C., Missouri, System Meteorological Bulletin*, No. 55–2, Jan. 5, **1955.** 5 p. tables. Pt. 1, **Analysis of January weather at K. C., Mo., as related to solar coronal emission intensities, 1951–1954, incl.** Pt. 2, **Discussion of possible solar activity for Jan. 1955. DWB**—It was found that the day of computed maximum emission intensity provides a better indicator of weather and upper air wind conditions than the latitudinal center of activity does, and that the intensity magnitude is important but varies from season to season in significance. Temperature changes are correlated with intensity maxima for 1–5 day lapse. Precipitation also shows a remarkable correlation with D−3 to D+3 of CMP of a center of enhanced green emission rated as moderate or higher. *Subject Headings:* **1. Solar-weather relationships 2. Kansas City, Mo.**—*M.R.*

8A–116 551.5:523.72

London, Julius (*N. Y. Univ.*), **Solar eruptions and the weather.** *New York Academy of Sciences, Transactions*, Ser. 2, 19(2):138–146, Dec. **1956.** 2 figs., table, 7 refs. **DLC**—Present knowledge on solar radiation and its variations, and on direct solar effects in the ionosphere and possibly the stratosphere, is reviewed. In respect to the troposphere, the author concludes "that there is probably no mechanism by which anomalous solar activity can directly affect the atmosphere below 50 km. The existence of a tropospheric effect thus depends on whether vertical pulses can be transmitted downward through the atmospheric layer 20 to 50 km." This is a problem to be solved by research into dynamics of the atmosphere rather than by purely statistical studies. *Subject Heading:* **1. Solar-weather relationships.**—*G.T.*

8A–117 551.513:551.590.21

*Morton, William C., III; Rubin, Morton J.; Schell, Irving I. and Willett, Hurd C., **Final Report on Weather Services, Inc., Boston,** Contract AF 19(604)-449, March 20, **1955.** 198 p. numerous figs., numerous tables, bibliog. p. 193–198, numerous eqs. **DWB**—A voluminous report, covering in 5 separate sections the work done by the project during 1953–54, to provide statistical and synoptic tools for aiding long range forecasters on a planetary scale. Pt. I covers work on synoptic statistical forecasting techniques done at GRD. Pt. II, purely statistical techniques (contingency tables), Pt. III, synoptic techniques based on mean charts, use of sunspot numbers, Southern Hemisphere anomalies, dynamic persistence, etc., Pt. IV, index parameters of circulation and sea surface conditions, and solar activity, Pt. V, preparation of operational long range forecasts. *Subject Headings:* **1. Statistical forecasting 2. Long range forecasting 3. Southern Hemisphere anomalies 4. Solar weather relationships. I. Weather Services Inc., Boston II. Contract AF 19(604)-449.**—*M.R.*

PART III. REVIEWS, TRANSLATIONS, REPRINTS, ROUTINE DATA PUBLICATIONS, AND ANALYTICS FROM RECENT SERIALS AND COLLECTED WORKS

Note: Material listed in Parts B and C of these sections will not be included in the monthly indexes until abstracted. The item number is mentioned for those titles which have been abstracted in previous issues of **Meteorological Abstracts and Bibliography.**

A. REVIEWS OF IMPORTANT METEOROLOGICAL MATERIAL

Assmann, Dietmar: **Die Wetterfühligkeit des Menschen: Ursachen und Pathogenese der biologischen Wetterwirkung** [Weather sensitivity of man: causes and pathogenesis of the biological action of weather]. Jena, VEB Gustav Fischer Verlag, 1955. 182 p. Price, DM 9,50 Review by R. Knepple in *Angewandte Meteorologie*, 2(9):286–287, July 1956.

Deutsche Antarktische Expedition 1938/1939: **Wissenschaftliche Ergebnisse, Bd. 2, Lief. 1, H. P** Kosack, **Die Neubearbeitung der Übersichtskarte der Arbeitsgebiete der Expedition** [and H. Regula, **Die Wetterverhältnisse während der Expedition und die Ergebnisse der meteorologischen Messungen** [Scientific results, Vol. 2, Section 1, H. P. Kosack, New edition of the survey map of the working area of the expedition [and] H. Regula, The weather condition during the expedition and the results of the meteorological measurements]. Hamburg, Verlag Geographisch-Kartographische Anstalt "Mundus," H. Striedieck, 1955. 40 p. maps. tables. Price, DM 14. Review by Th. Stocks in *Deutsche Hydrographische Zeitschrift*, 8(4) 168, 1955.

Die Erde: Zeitschrift der Gesellschaft für Erdkunde zu Berlin, No. 3/4, 1955 [A special number devoted entirely to Australian geography]. 125 p. photos and maps. Review by R. S. Mathieson in *Australian Journal of Science*, 19(1):39–41, Aug. 1956.

Eklund, Bo: **Årsringsbreddens klimatiskt betingade variation hos tall och gran inom norra Sverige aren 1900–1944** [Variations in the widths of the annual rings in pine and spruce due to climatic conditions in northern Sweden, 1900–1944]. *Stockholm. Statens Skogsforskningsinstitut. Meddelanden*, 44(8):1–150, 1954. 36 figs., 34 tables. Review by Max Onno in *Wetter und Leben*, Vienna, 8(3/4):86, 1956.

Golding, E. W.: **The generation of electricity by wind power.** London, Spon's Electrical-Engineering series, 1956. 318 p. 101 figs., 28 plates, 38 tables. Price, 50s. Review by R. S. Scorer in *Royal Meteorological Society, Quarterly Journal*, 82(354):547–548, Oct. 1956. (*See* 7.11–5 Nov. 1956, *MAB.*)

International Union of Geodesy and Geophysics. Association of Meteorology, Rome, Sept. 1954 **Scientific Proceedings.** London, Pub. for the Association by Butterworths Scientific Publications, 1956. 594 p. figs., tables, refs., bibliogs. throughout. Price, 80 sh. Review by K Langlo in *World Meteorological Organization, WMO Bulletin*, 5(4):167, Oct. 1956. Review by P. A. Sheppard in *Royal Meteorological Society, Quarterly Journal*, 82(354):544–545, Oct. 1956 Review by F. Steinhauser in *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A* 9(3):431–432, 1956. Review in *Indian Journal of Meteorology and Geophysics*, 7(4):407, Oct. 1956. (*See* 8.1–2, Jan. 1957, *MAB.*)

Kolobkov, N. V.: **Aviameteorologicheskie nabliudeniia** [Observations in aviation meteorology]. Moscow, Izdat. DOCAAF, 1954. 175 p. illus. Review by V. A. Shtal' in *Meteorologiia i Gidrologiia*, Leningrad, No. 1:57–58, Jan. 1956.

Logvinov, K. T.: **Dynamische Meteorologie** [Dynamic meteorology]. trans. from Russian under editorship of Dr. H. Philipps. Berlin, Deutsche Verlag der Wissenschaften, 1955. 154 p. 43 figs. Review by Paul Raethjen in *Annalen der Meteorologie*, 7(5/6):287–288, 1955/1956.

Murray, R.: **Some features of jet streams as shown by aircraft observations.** London, H. M. Stationery Office, 1956. 26 p. 17 figs. Review by B. C. Frost in *Institute of Navigation, London, Journal*, 9(4):476, Oct. 1956. (*See* 7.6–9, June 1956, *MAB.*)

Ramakrishnan, K. P. and Narayanan, J.: **A study of fifty years' rainfall of Mangalore.** *India Meteorological Dept., Memoirs*, 30(3):1955. 52 p. illus. Price Rs 6–14, or 11 sh. Review by R. G. Veryard in *Meteorological Magazine*, 85(1,010):253–254, Aug. 1956.

Saucier, W. J.: **Principles of meteorological analysis.** Chicago, Chicago Univ. Press, 1955. 438 p. illus. Price, 75s. Review by N. Bradbury in *Meteorological Magazine*, 85(1,010):251–253, Aug. 1956. (*See* 7.3–7, March 1956, *MAB.*)

Symposium on Artificial Rain, New Delhi, Feb. 1953: [**Proceedings and papers**] **of Symposium held under joint auspices of Atmospheric Research Committee, CSIR and India Meteorological Dept.** New Delhi, Council of Scientific and Industrial Research, 1955. 148 p. figs., tables, foot-refs., bibliogs. Special bibliog. p. 135–148. Review by K. R. S. in *Science and Culture*, Calcutta, 22(3):185–186, Sept. 1956.

Van Bladel, J.: **Les applications du radar à l'astronomie et à la météorologie** [The applications of radar to astronomy and to meteorology]. Paris, Gauthier-Villars, 1955. 147 p. 55 figs., 6 tables. Price, 1,600 fr. Review by I. C. Browne in *Royal Meteorological Society, Quarterly Journal*, 82(354):550–551, Oct. 1956.

Watts, I. E. M.: **Equatorial weather: with particular reference to south-east Asia.** University of London Press, 1955. 224 p. 129 figs., 8 plates. Price 25s. Review by A. G. Forsdyke in *Royal Meteorological Society, Quarterly Journal*, 82(354):550, Oct. 1956. (*See* 7.4–10, April, 1956, *MAB.*)

B. TRANSLATIONS, REPRINTS, AND ROUTINE DATA PUBLICATIONS

Translations

Yaroslavtsev, I. N.: **Nabliudeniia infrakrasnoi radiatsii vo vremia solnechnogo zatmeniia 30 iiunia 1954 g. v Tashkente** [Observations of infrared radiation during the solar eclipse of June 30, 1954 at Tashkent]. [In] *Akademiia Nauk SSSR, Izvestiia, Ser. Geofiz.*, No. 2:185–186, March/April 1955. Translation into English by E. R. Hope. Issued as *Canada. Defence Research Board, TR* 213, June 1956. (*For abstract on original, see* 7.4–176, April 1956, *MAB.*)

Zapitsa, P. L.: **O prirode sharovoi molnii** [Nature of ball lightning]. [In] *Akademiia Nauk SSSR, Doklady*, n.s., 101(2):245–248, March 1955. 7 refs. Trans. into English by Consultants Bureau, N. Y., as *Soviet Research in Physics, Collection*, No. 3, Paper No. 5:17–20, 1956 (?). 7 refs.

Zist, Robert J. and de Quervain, M.: **Zur Struktur von Hagelkörnern** [On the structure of hail stones]. [In] *Zeitschrift für Angewandte Mathematik und Physik*, 4(6):492–496, Nov. 15, 1953. 17 figs., foot-ref. Trans. into English by D. A. Sinclair. Issued as *National Research Council of Canada, Technical Translation* TT-551, 1955. 17 figs., ref. (*See* 5.9–246, Sept. 1956.)

Zakharov, A. D.: **Vzaimodeistvie elektrona i pozitrona pri rozhdenii par** [Interaction of an electron and positron in pair production]. [In] *Zhurnal Eksperimental'noi i Teoreticheskoi Fiziki*, Moscow, 18(7):631–635, 1948. Trans. into English by Richard Prepost; ed. by David Kraus. Issued by American Meteorological Society under Contract AF 19(604)-1364, Aug. 1956. 19 p. 6 refs., 13 eqs.

Schwerdtfeger, Werner: **Bases para el prognóstico a medio plazo de las condiciones de temperatura en el otoño de Buenos Aires** [Bases for statistical forecasts of the fall temperature conditions at Buenos Aires]. [In] *Meteoros*, Buenos Aires, 1(1):33–45, Jan. 1951. 5 tables, refs. Trans. into English by Valda Dreimanis and David Kraus. Issued by American Meteorological Society under Contract AF 19(604)-1364, 1956. 20 p. fig., 5 tables, refs. (*See* 2.9–46, Sept. 1951.)

Reprints

Fea, Giorgio: **Il programma italiano sulle richerche de fisica delle nubi** [Italian research program in cloud physics]. *International Union of Geodesy and Geophysics. Assoc. of Meteorology, Rome, Sept. 1954, Scientific Proceedings.* London, Butterworth, 1956. p. 69–74. 5 refs. (*For abstract on this paper from another source see* 6J–360, Oct. 1955, *MAB.*)

Murgatroyd, R. J.; Goldsmith, P. and Hollings, W. E. H.: **Interim report on measurements of humidity from aircraft to heights of about 50,000 feet over Southern England.** *I.U.G.G. Assoc. of Meteorology, Rome, 1954, Scientific Proceedings.* pub. 1956. p. 221–234. 4 figs., 2 tables, 6 refs. (*See* 6.6–258, June 1955.)

Paetzold, H. K.: **New experimental and theoretical investigations on the atmospheric ozone layer.** *I.U.G.G. Assoc. of Meteorology, Rome, 1954, Scientific Proceedings.* pub. 1956. p. 201–212. 8 figs., table, 29 refs. (*See* 7.2–75, Feb. 1956.)

Santomauro, L.: **Considerazioni meteorologiche sulla lotta contro la grandine** [Meteorological considerations in the fight against hail]. *Milan. Osservatorio Astronomico de Milano-Merate Supplementi Meteorologici*, No. 9, 1955. 22 p. 12 refs. (*See* 6J–365, Oct. 1955.)

Routine Data Publications

Australia. Bureau of Meteorology: **Australian radiation records, 1955.** pub. 1956. 4 p. Almost entirely tables. (*See* 7.4–167, April 1956, *MAB, for abstract on Jan.–June 1954 issue.*)

Denmark. Meteorologisk Institut: **Meteorologisk Årbog, 1951, II del, Grønland** [Meteorological yearbook, 1951, Pt. 2, Greenland]. Also 1952, Pt. 2, both pub. Copenhagen, Trykt i Horsholm, 1956. Each about 50 p. Almost entirely tables. (*See* 3.10–43, Oct. 1952, *for 1943, Pt. 2.*)

Fernley Meteorological Observatory, Southport, England: **Annual report and results of meteorological observations for 1954.** pub. 1955. 24 p. tables. (*See* 6.3–47, March 1955 *for 1953 issue.*)

Geneva. Observatoire: **Resumé météorologique de l'année 1955 pour Genève** [Meteorological summary for Geneva for 1955]. Comp. by Ernest Rod. Its *Publication, Série M, Météorologie,* No. 30, 1956. 13 p. Almost entirely tables. (*See* 2K–88, Nov. 1951 *for 1927–1936 issues and* 5.2–39, Feb. 1954 *for 1951 issue.*)

Geophysical Digest, Calcutta, Vol. 2, No. 1/2, Jan./April 1954 and Vol. 2, No. 3/4, July/Oct. 1954. About 30 p. each. mimeographed. (*See* 6A–25, Jan. 1955, *for Vol. 1, No. 1–4, Jan.–Oct. 1953.*)

Japan. Meteorological Agency, Tokyo: **Annual report of agricultural meteorology, 1955.** pub. Aug. 1956. 91 p. 57 figs. Almost entirely tables. (*See* 7.3 80, March 1956 *for 1954 issue.*)

Rabat, Morocco. Institut Scientifique Chérifien. Service de Physique du Globe et de Météorologie: **Annales, Vol. 15, 1949.** pub. 1955. 122 p. figs., map, tables, bibliog. p. 117–120. (*See* 7.3–99, March 1956, *for Vol. 14, 1948, pub. 1955.*)

Uppsala. Meteorologiska Institutionen: **Bulletin Mensuel de l'Observatoire Météorologique de l'Université d'Uppsala, Vol. 86, 1154,** ed. by Hilding Köhler. pub. 1956. 76 p. almost entirely tables. (*See* 7.5–75, May 1956 *for Vol. 85, 1953 issue, pub. 1955.*)

C. METEOROLOGICAL ARTICLES APPEARING IN RECENTLY ISSUED PUBLICATIONS

Acta Hydrophysica, Berlin, Vol. 1, No. 1, 1953

Schmitz, H. P.: **Über die Abkühlung von Binnenseen,** [The cooling of lakes], p. 7–30

Fischer, Johannes: **Über nomographische Verfahren in der Hydrographie, Teil I,** [Nomographic methods in hydrography, Pt. 1], p. 31–44

Steleanu, Adrian: **Zum Problem der Beeinflussung und Begrenzung des Seenplanktons durch physikalische Faktoren,** [On the physical factors affecting and limiting lake plankton], p. 45–56

Vol. 1, No. 3, 1953

Griesseier, H.: **Zur Reflexion der direkten Sonnenstrahlung an einer bewegten Wasseroberfläche,** [Reflection of direct solar radiation from an agitated water surface], p. 107–133

Fischer, Johannes: **Nomogram zur Berechnung der trigonometrischen Funktion** $y = {}^{+}g\beta = \frac{2\pi}{s} \sin\left[2\pi\left(\frac{\xi}{\lambda} \pm n\right)\right]$, [Nomogram for calculating the trignometric function $y = {}^{+}g\beta = \frac{2\pi}{s} \sin\left[2\pi\left(\frac{\xi}{\lambda} \pm n\right)\right]$], p. 134–139

Vol. 1, No. 4, 1954

Fortak, Heinz: **Zur Bedeutung der in der Clebsch-Transformation der hydrodynamischen Gleichungen auftretenden Funktionen,** [The meaning of the functions appearing in the Clebsch transformation of the hydrodynamic equations], p. 145–150

Ertel, Hans: **Theorie der thermischen Sprungschicht in Seen,** [Theory of a thermal discontinuity layer in lakes], p. 151–171

Czepa, Otto: **Über die spektrale Reflexion der Globalstrahlung an Wasseroberflächen,** [Spectral reflection of global radiation from water surfaces], p. 172–177

Vol. 2, No. 1, 1954

Fischer, Johannes: **Über eine "nicht nomographierbare" Funktion,** [A "non-nomographable" function], p. 5–9

Vollbrecht, Kurt: **Beiträge zum Problem brandender Wellen,** [Contribution to the problem of breaking waves], p. 10–30

Vol. 2, No. 2, 1954

Griesseier, H.: **Über die Reflexion der diffusen Himmelsstrahlung an einer unbewegten Wasseroberfläche,** [Reflection of diffuse sky radiation from a still water surface], p. 3–42

Vol. 2, No. 4, 1955

Czepa, Otto: **Eichwerte der Farbskala von Forel zur Bestimmung der Meerwasserfarbe,** [Calibration values of the Forel color scale for determining sea water color], p. 145–147

Czepa, Otto: **Strahlungsverhältnisse einiger Seen in Mecklenburg,** [Radiation conditions of a few lakes in Mecklenburg], p. 148–151

Fischer, Johannes: **Nomogramm zur Bestimmung des nichtlinearen Massstabes auf angewandten Karten,** [Nomogram for determining a nonlinear scale on applied charts], p. 152–157

Schmitz, H. P.: **Zur Theorie des Austausches von Salzgehalt und Wärmeinhalt im Meere,** [On the theory of the exchange of salinity and heat content in the sea], p. 158–177

Vol. 3, No. 1, 1955

Schmitz, H. P.: **Zur Ermittlung der Durchflussmengenänderung in Kanälen und Flüssen infolge zeitlich variabler Windeinwirkung,** [Determination of canal and river discharge variations caused by wind action varying with time], p. 5–23

Schmitz, H. P.: **Über die vertikale Geschwindigkeitsverteilung in Kanälen und Flüssen und ihre Beeinflussung durch Wind,** [Vertical velocity distribution in canals and rivers and their dependence on wind], p. 24–48

Vol. 3, No. 2, 1956

Steleanu, Adrian: **Über den gegenwärtigen Stand der Limnologie in Italien, I. Teil,** [Present state of limnology in Italy, Pt. 1], p. 53–100

Vol. 3, No. 3, 1956

Steleanu, Adrian: **Über den gegenwärtigen Stand der Limnologie in Italien, II. Teil,** [Present state of limnology in Italy, Pt. 2], p. 105–138

Schmitz, H. P.: **Ein neuer Beweis des Theorems von H. ERTEL über asynchronperiodische Wirbelbewegungen kompressibler Flüssigkeiten,** [New verification of H. Ertel's theory of asynchronous-periodic eddy motion of compressible fluids], p. 147–155

Vol. 3, No. 4, 1956

Czepa, O. and Schellenberger, G.: **Über den Wärmehaushalt des Breiten Lucin- und Haussees bei Feldberg (Mecklbg.),** [Heat economy of Lakes Breiter Lucin and Haussee near Feldberg, Mecklenburg], p. 161–180

kademiia Nauk SSSR, Izvestiia, Ser. Geofizich., No. 3, March 1956

Dmitriev, A. A.: **O modelirovanii geofizicheskikh tsirkuliatsii vo vrashchaiushchemsia parabolicheskom sosude,** [Model of the geophysical circulation in a rotating parabolic vessel], p. 320–326

Monin, A. S.: **Gorizontal'noe peremeshivanie v atmosfere,** [Horizontal mixing in the atmosphere], p. 327–345

Morozov, V. M.: **Ob opredelenii izmenenii temperatury vozdukha v stratosfere v zavisimosti ot vremeni putem prozhektornogo zondirovaniia,** [The determination of the variations of atmospheric temperature in the stratosphere as a function of time by means of sounding with a searchlight], p. 366–371

No. 4, April 1956

Fedorov, K. N.: **Uroven' i techeniia vo vremia katastroficheskogo shtorma v severnom more v 1953 g.,** [Water level and currents during the catastrophic storm of 1953 in the North Sea], p. 437–451

Monin, A. S.: **O makroturbulentnom obmene v zemnoi atmosfere,** [Macroturbulent exchang in the earth's atmosphere], p. 452–463
Morozov, V. M. and Shklovskii, I. S.: **O svechenii dnevnogo neba,** [Brightness of the sky by day], p. 463–468

American Meteorological Society, Bulletin, Vol. 37, No. 9, Nov. 1956

Austin, James M. and Blackmer, R. H., Jr.: **Variability of cold front precipitation,** p. 447–45
Anderson, Albert D. and Hoehne, Walter E.: **Experiments using window to measure high altitude winds,** p. 454–457
Palmer, Wayne C.: **Weather service to agriculture in the Western Great Plains,** p. 458–461
Saucier, W. J. and Brundidge, K. C.: **Variability of wind direction in relation to wind speed** p. 462–464
Bundgaard, Robert C.: **Estimating vorticity advection,** p. 465–472
Fletcher, Robert D.: **Two outstanding problems of modern meteorology,** p. 473–476
Roberts, Walter Orr: **Cross-field seminar on possible responses of terrestrial atmospheri circulation to changes in solar activity,** p. 477–479
Mauna Loa Observatory, p. 487–488
International Geophysical Year, p. 489

Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A, Vol. 9, No. 3, 1956

Schneider-Carius, K.: **Grundschicht und Nullschicht, zwei polare Schichtbildungen in de Troposphäre,** [Ground layer and null layer, two polar layers in the troposphere], p. 305–32
Knizek, F. and Reuter, H.: **Über den Wärmehaushalt der unteren Luftschichten an heitere Tagen und die Prognose des Maximums der Lufttemperatur,** [On the heat economy of th lower air layers and the prognosis of the maximum air temperature], p. 324–338
Drimmel, Julius: **Wo ist das äquivalentbarotrope Niveau zu suchen? Zur graphischen In tegration der barotropen Wirbelgleichung nach FJÖRTOFT,** [Where is the equivalen barotropic level to be sought? On graphic integration of the barotropic vorticity equatio after FJÖRTOFT], p. 339–342
Drimmel, Julius: **Zur Physik der Taubildung an der Erdoberfläche,** [On the physics of dew formation on the earth's surface], p. 343–356
Kasemir, H. W.: **Zur Strömungstheorie des luftelektrischen Feldes III: Der Austauschge nerator,** [On the current theory of the atmospheric electric field III: the austausc generator], p. 357–370
Conrad, V.: **On thermal springs: a contribution to knowledge of their nature,** p. 371–405
Toperczer, M.: **Das geophysikalische Observatorium Wien-Kobenzl,** [The Geophysical Ob servatory of Vienna [Kobenzl]], p. 406–420

Conference on the Scientific Basis of Weather Modification Studies, Univ. of Arizona, Tucson April 10–12, 1956, Proceedings. Pub. by the Univ. 1956 (*Note: Each paper repaged*

Conference program. 6 p.
List of participants and observers. 4 p.
Harvill, Richard A.: **Greetings to the Conference on the Scientific Basis of Weather Modifica tion.** 2 p.
Byers, Horace R.: **Historical resume of research relating to weather modification.** 8 p.
Petterssen, S.: **A brief survey of the artificial cloud nucleation program.** 1 p.
Spar, Jerome: **A large-scale experiment in weather modification.** 1 p.
Hall, W. Ferguson: **Cloud-seeding potential in middle-latitude cyclones** 2 p.
aufm Kampe, H. J.; Kelly, J. J. and Weickmann, H. K.: **Seeding experiments in supercoole stratus type clouds.** 2 p.
Weickmann, H. K.: **Stratus cloud seeding in Western Germany, January and February 195** 3 p.
Bowen, E. G.: **An aircraft seeding operation in the Snowy Mountains area of Australia an further experiments on silver iodide decay.** 1 p.
Fournier d'Albe, E. M.: **Some remarks on the planning and evaluation of experiments in clou seeding with hygroscopic particles.** 2 p.
Hales, J. Vern; Hoffer, Thomas E.; Peck, Eugene L. and Anderson, C. Keith: **Cloud seedin evaluation in Utah.** 2 p.
Neumann, J.: **Artificial stimulation of precipitation: a report on activities in Israel.** 3 p.
Reichelderfer, F. W.: **Some conclusions from field tests and studies of cloud seeding by th Weather Bureau** 2 p.

Decker, Fred W.; Lincoln, Russell L. and Day, John A.: **Weather modification operations should not choke off their own development.** 2 p.
Battan, Louis J.: **Design of the University of Chicago cloud modification experiments.** 2 p.
Byers, Horace R.: **Results of the University of Chicago cloud modification experiments.** 2 p.
Godson, Warren L.: **The statistical combination of results in the evaluation of weather modification projects.** 2 p.
Brier, G. W.: **An appraisal of some statistical results from weather modification studies.** 2 p.
Thom, H. C. S.: **An evaluation of a series of orographic cloud seeding operations** 2 p.
Brownlee, K. A.: **Statistical tests by the method of a control of the rainmaking hypothesis: some alternative viewpoints.** 2 p.
Neyman, Jerzy: **Observational prerequisites to a decisive statistical evaluation of cloud seeding operations.** 2 p.
Anderson, Charles E.: **Some remarks on general principles of weather modification** 1 p.
Ludlam, F. H.: **Problems of weather modification** 1 p.
McDonald, James E.: **Climatological studies prerequisite to a rational weather modification program.** 2. p.
Mason, B. J.: **Some fundamental problems in large-scale cloud seeding.** 2 p.
Braham, Roscoe R., Jr.: **Systematic cloud studies as a prerequisite for cloud modification experiments** 1 p.
Kassander, A. Richard, Jr.: **Some field studies basic to cloud physics research** 2 p.
Sänger, Raymund: **On the structure of ice-forming nuclei.** 2 p.
Schaefer, Vincent J.: **Ice crystal nuclei in the free atmosphere.** 1 p.
Hatakeyama, H.: **The formation of freezing nuclei on a plane and some other developments in the rainmaking experiment made in Japan.** 1 p.
Hosler, C. L.: **Control of ice formation in clouds in order to produce maximum precipitation growth** 3 p.
Woodcock, A. H.: **Suggestions for cloud modification research derived from studies of sea salt in the air and in rains** 2 p.
Dessens, Henri: **From rain stimulation to cumulus stimulation** 2 p.
Cunningham, R. M.: **Humidities and air circulations in and around cumulus clouds.** 2 p.
Workman, E. J.: **Thermodynamic processes and cloud seeding.** 1 p.
Vonnegut, B. and McMahon, H. O.: **A possible effect of cloud seeding on the efficiency of energy transformation.** [*Title only. No abstract.*] 1 p.
Mason, B. J.: **Microphysical aspects of cloud seeding.** 3 p.
Spar, Jerome: **The problem of modification of large scale cloud systems: summary paper.** 2 p.
Woodbury, Max: **The Advisory Committee for Weather Control statistical program.** 2 p.
Bowen, E. G.: **Summary talk on cloud seeding and seeding technology.** 3 p.
Houghton, Henry G.: **Some impressions at the close of the conference.** 5 p.
Abstracts only given of most papers.

Expéditions Polaires Françaises. Missions Paul-Émile Victor, Résultats Scientifiques

Series N (Expéditions Arctiques, V, (Météorologie) [unnumbered reports]

Les observations météorologiques de la Station Française du Groenland, 70°55′93″N—40°38′22″ W—altitude 2993 m.: conditions atmosphériques en surface du 5 Septembre 1949 au 20 juin 1950. [Meteorological observations at the French Greenland station, 70°55′93″N—40°38′22″W—altitude 2993 m.; atmospheric conditions at the surface and aloft, Sept. 5, 1949–June 20, 1950.] 2 vol. pub. 1954

——: **conditions atmosphériques en surface du 21 juin 1950 au 15 aout 1951** (comp. by Bernard Bedel). 2 vol. (unpublished?)

——: **conditions atmosphériques en altitude du 17 septembre 1949 au 19 août 1951** (comp by Bernard Bedel). pub. 1954

Series S (Expéditions Anarctiques), V (Météorologie), [unnumbered reports]

Les observations météorologiques de Port-Martin en Terre-Adélie 66°49′04″S—141°23′39″E—altitude 14 m, Fasc. 1, conditions atmosphériques en surface et en altitude du 14 février 1950 au 14 janvier 1951: relevés quotidiens et commentaires (comp. by Henry Boujon). [Meteorological observations at Port-Martin in Adelie Land, 66°49′04″S—141°23′39″E—altitude 14 m, Pt. 1, Atmospheric conditions at the surface and aloft, Feb. 14, 1950–Jan. 14, 1951: daily observations and commentary.] pub. 1954

——, **Fasc. 2, Conditions atmosphériques en surface du 1er janvier 1951 au 20 janvier 1952: relevés quotidiens** (comp. by André Prudhomme and Robert Le Quinio). pub. 1954

——, **Fasc. 3, Conditions atmosphériques en altitude du 17 janvier au janvier 1952: relevés quotidiens (comp. by André Prudhomme and Robert Le Quinio)** pub. 1954

——, **Fasc. 4 Conditions atmosphériques en surface et en altitude de février 1950 à janvier 1952: résultats complémentaires** [unpublished?]

Les observations météorologiques de Pointe Géologie en Terre Adélie 66°40′S—140°01′E—altitude 14 m.:conditions atmosphériques en surface et en altitude du 18 février 1952 au 30 décembre 1952: relevés quotidiens et moyennes, (comp. by Georges Le pineux). pub. 1956

Geofisica Pura e Applicata, Milan, Vol. 34, 1956

Jacobs, J. A. and Obayashi, T.: **The average electric current system for the sudden commencements of magnetic storms,** p. 21–35

Heuberger, Jean-Charles: **Mesures de températures dans l'Ice-Cap du Groenland,** [Temperature measurements in the Greenland Ice Cap], p. 71–73

Wegener, Kurt: **Die Beziehung zwischen Luft-Temperatur, Sonnen-Strahlung und Boden,** [Relation between atmospheric temperature, solar radiation and soil], p. 74–78

Gião, Antonio, and Ferreira, M.: **Introduction à la climatologie dynamique de l'Amérique du nord, de l'Atlantique nord et de l'Europe,** [Introduction to a dynamic climatology of North America, the North Atlantic and Europe], p. 101–150

Gião, Antonio: **Sur le comportement du vecteur d'advection des perturbations et du tourbillon vertical en altitude,** [Behavior of the advection vector of perturbations and of vertical vorticity with height], p. 151–176

Pollak, L. W.; O'Connor, T. C. and Metnieks, A. L.: **On the determination of the diffusion coefficient of condensation nuclei using the static and dynamic methods,** p. 177–195

Fürth, R.: **Comments on static diffusion measurements in nucleus counters,** p. 192–195

Albrecht, Hans J.:**Direct-coupled thermocouple amplifiers for measurement in geophysics and meteorology,** p. 196–206

Burkard, O.: **Eine einheitliche Formel für die morgendliche F_2-Ionisation an europäischen Stationen,** [A universal formula for F_2 ionization in the morning at European stations], p. 207–210

Schaefer, Vincent J.: **Atmospheric electrical measurements in the Hawaiian Islands,** p. 211–220

Malan, D. J.: **Visible electrical discharges inside thunderclouds,** p. 221–223

Malan, D. J.: **The relation between the number of strokes, stroke intervals and the total durations of lightning discharges,** p. 224–230

Urfer, Alfred: **Sur les changements du gradient vertical de température dans le brouillard de rayonnement,** [Changes of the vertical temperature gradient in radiation fog], p. 231–245

Van der Bijl, W.: **The constant temperature-sum as a basis for forecasting flowering date,** p. 246–252

Hesse, W.: **Der Wasserhaushalt von Kulturpflanzen,** [The water economy of cultivated plants], p. 253–259

International Union of Geodesy and Geophysics. Association of Meteorology, Rome, Sept. 1954, Scientific Proceedings. London, pub. for the I.U.G.G. Association of Meteorology by Butterworths Scientific Publications, 1956

Ramanathan, K. R.: **Atmospheric ozone and the general circulation of the atmosphere (presidential address),** p. 3–24. (*See* 7.6–103, June 1956, *MAB*)

Synoptic Meteorology

Bijvoet, H. C.: **On the causes of the severe north-westerly gale in the North Sea on January 31–Feb. 1, 1953,** p. 27–30

Pône, R.: **Analyse tridimensionnelle des masses d'air à l'aide de l'énergie,** [Three-dimensional analysis of air masses by means of total energy], p. 31–37

Spinnangr, Finn: **On orographic precipitation in Norway,** p. 38–43

Gazzola, Adriano: **Le jet-stream dans une situation de bloquage,** [Jet stream during a blocking situation], p. 44–49

Cloud Physics

Lhermitte, R.: **Structure verticale des échos de pluie,** [Vertical structure of rain echoes], p. 53–57

Facy, L.: **Sur la capture par la phase condensante des particules submicroscopiques soumises à un gradient de tension de vapeur,** [Capture during the condensation phase of sub-microscopic particles under a vapor pressure gradient], p. 58–61

Arnulf, A.; Bricard, J. and Veret, C.: **Recherches sur la propagation de la lumière visible et infra-rouge à travers les nuages et le brouillard,** [Studies on the propagation of visible and infra-red light through clouds and fog], p. 62–63

Vittori Antisari, Ottavio: **Sur le répartition dans l'atmosphère des noyaux de condensation et des particules obtenues par solidification de la vapeur,** [Dispersion in the atmosphere of condensation nuclei and of particles obtained by the solidification of vapor], p. 64–66. (For version in Italian, *see* 6I–124, September 1955, *MAB*)

Roncali, G.: **Sur l'emploi du radar dans la lutte contre la grêle,** [Use of radar in the fight against hail], p. 67–68

Fea, G.: **Il programma italiano sulle ricerche de fisica delle nubi,** [Italian research program in cloud physics], p. 69–74. (*See* 6J–360, Oct. 1955, *MAB*)

Climatology

Karapiperis, P. P.: **Trends in Athens temperature,** p. 77–78. (*See* 6.8–233, Aug. 1955, *MAB*)

Vujević, P.: **Corrélations entre les pressions barométriques et les précipitations en Yougoslavie,** [Correlation between barometric pressures and rainfall in Yugoslavia], p. 79–85

Pramanik, S. K. and Jagannathan, P.: **Climatic changes in India,** p. 86–138. (Pt. 1, *see* 6.1–274; Pt. 2, *see* 6.6–229, Jan. and June, 1955, *MAB*)

Karapiperis, L. N.: **Rainfall in the Mediterranean region in relation to solar activity,** p. 139–140. (*See also* 6.2–259, Feb. 1955, *MAB*)

Rosini, E.: **Quelques résultats de l'élaboration statistique des observations météorologiques en Italie pendant les anneés 1946–1953,** [Some results of a statistical study of meteorological observations in Italy during 1946–1953], p. 141–144

Arakawa, H. : **Climatic change as revealed from freezing dates of Lake Suwa (36°N, 138°E) in Central Japan,** p. 145–146

Colloquium on Atmospheric Ozone and Circulation in the Lower Stratosphere and in the Substratosphere

Fournier d'Albe, E. M.: **Some observations on nocturnal ozone,** p. 149–158

Dütsch, H. U.: **A daily variation of the total amount of ozone,** p. 159–162

Chalonge, D.: **Mesures d'ozone pendant la nuit,** [Ozone measurements at night], p. 163–164

Normand, C. W. B.: **On the European ozone observations 1950–1954,** p. 165–171

Miyake, Yasuo and Kawamura, K.: **Studies on atmospheric ozone at Tokyo,** p. 172–176. (*See* 6.9–141, Sept. 1955, *MAB*)

Martin, D. W. and Brewer, A. W.: **Some synoptic aspects of the European results,** p. 177–180

Regener, Victor H.: **New experimental results on atmospheric ozone,** p. 181–188

Kay, R. H.; Brewer, A. W. and Dobson, G. M. B.: **Some measurements of the vertical distribution of atmospheric ozone by a chemical method to heights of 15 km from aircraft,** p. 189–193

Khalek, Abdul and Vassy, Mme. A.: **Mesures relatives à l'ozone atmosphérique en Afghanistan,** [Measurements of atmospheric ozone in Afghanistan], p. 194–197

Nicolet, Marcel: **Ozone variations above 50 km,** p. 199–200

Paetzold, H. K.: **New experimental and theoretical investigations on the atmospheric ozone layer,** p. 201–212. (*See* 7.2–75, Feb. 1956, *MAB*)

Gowan, E. H.: **Atmospheric ozone over Edmonton, 1951–53,** p. 213–214

Vassy, A. et E.: **Nouvel appareil pour la mesure de l'épaisseur d'eau condensable,** [New apparatus for measurement of the amount of condensable water], p. 215–216

Dütsch, H. U.: **A revised large-scale mixing scheme and its application to the ozone problem,** p. 217–220

Murgatroyd, R. J.; Goldsmith, P. and Hollings, W. E. H.: **An interim report on measurements of humidity from aircraft to heights of about 50,000 feet over southern England,** p. 221–234. (*See* 6.6–258, June 1955, *MAB*)

International Research Programme

Schumann, T. E. W.: **Proposal for a planned international research programme,** p. 237–247. (*See* 6.8–115, Aug. 1955, *MAB*)

Dynamic Meteorology

Queney, P.: **Considérations théoriques sur le problème des ondes de relief. Théorie simple des "rotors,"** [Theoretical considerations of the problem of orographic waves], p. 251–259

Zierep, J.: **Instationäre Leewellen,** [Non-stationary lee waves], p. 260–263

Defrise, P.: **La notion de mécanique interne et la météorologie,** [Idea of internal mechanics and meteorology], p. 264–267

General Circulation of the Atmosphere

Visser, S. W.: **The 27-day period,** p. 271. (For German language version, *see* 5.10–138, Oct. 1954, *MAB*)

Obuljen, Ante: **Die Zirkulation der Erdatmosphäre als ein geophysikalisches Problem,** [Circulation of the earth's atmosphere as a geophysical problem], p. 272–276

Yakuwa, Risuke: **Climatic conditions and the atmospheric circulation over the region of northern Japan,** p. 277–288

Bergeron, T.: **Multiple frontal systems as links in the general atmospheric circulation, (Summary, only),** p. 289

Viaut, A.: **Quelques considérations sur le champ de pression et les perturbations du front polaire austral dans le SSO de l'Océan Indien,** [Some considerations on the field of pressure and the perturbations of the southern polar front in the south-south-west Indian Ocean], p. 290–301

Defant, F.: **Characteristic meridional temperature profiles and their changes during high and low index types of the general circulation,** p. 302–304

Serra, Antonio: **Su una serie di osservazioni aerologiche dell'alta troposfera e bassa stratosfera interessanti il Mediterraneo Occidentale,** [On a series of aerological observations of the upper troposphere and lower stratosphere over the Western Mediterranean], p. 305–309. (*See* 7.10–76, Oct. 1956, *MAB*)

Colloquium on Storm Tides (Papers listed by title only. To be published in Procès-Verbaux of I.U.G.G. Association of Physical Oceanography), p. 313

Doodson, A. T.: **Storm surges**

Groen, P.: **On the dynamics of wind surges in a bay or marginal sea**

Hellström, B.: **Certain recent investigations in connection with storm surges**

Rossiter, J. R. L.: **The prediction of storm surges from meteorological forecasts**

Carruthers, J. N. and Lawford, A. L.: **Progress of the storm surge of January 31–February 1, 1953 indicated by current meter observations in the southern North Sea**

Bowden, K. F.: **The effect of flow through the Straits of Dover on storm surges in the North Sea**

Egedal, J.: **Some remarks on storm surges in interior Danish waters**

Farquharson, W. I.: **Probabilities of very high levels at certain ports on east coast of England**

Hansen, W.: **Dynamical investigations of storm surges**

Goldsbrough, G. R.: **Wind effects on the motion of the sea in an infinite channel and in a rectangular gulf**

Proudman, J.: **The dynamics of storm surges**

Schönfeld, J. C.: **Combination effects of meteorological and astronomical tides**

Freeman, J. C., Jr.: **Two-dimensional storm tides in shallow water**

Charnock, H.: **The drag of the wind on the sea**

Munk, W. H.: **A numerical filter to reduce diurnal and semidiurnal tides**

Hachey, H. B.: **Storm surges and internal adjustments in the water mass**

Freeman, J. C. and Bates, C. C.: **Present status of storm surge research in the United States of America**

Colloquium on the Problems of Tropical Meteorology and the Relations Between Circulation in Tropical and Extra Tropical Latitudes

Ramanathan, K. R.: **Problems of tropical meteorology and the relation between the circulations of tropical and extratropical latitudes,** p. 317–321

Sutcliffe, R. C. and Bannon, J. K.: **Seasonal changes in upper air conditions in the Mediterranean-Middle East area,** p. 322–334

Desai, B. N. and Rao, Y. P.: **On the formation and direction of movement of some recent severe cyclones in the Indian seas,** p. 335

Berlage, H. P.: **The southern oscillation, a 2–3 year fundamental oscillation of world-wide significance,** p. 336–345

Koschmieder, H. and Meyer, J.: **Wolkenphotogrammetrie,** [Cloud photogrammetry], p. 346–356

Goldberg, J.: **Climatic fluctuations in Yugoslavia and the circulation in the Mediterranean area,** p. 357

Takahashi, K. et al.: **Long periodic oscillations of the atmosphere between low and high latitudes,** p. 358

Byers, H. R.: **Differences between cumulus clouds of tropical and extratropical regions,** p. 359

Meteorological Instruments

Väisälä, V.: **Theory of the lag coefficient of hygroscopic hygrometers,** p. 363–368. (*See* 5.2–59, Feb. 1954, *MAB*)
Pollak, L. W.; Murphy, T. and O'Connor, T. C.: **The uncertainties in measurements of concentration of condensation nuclei with photoelectric counters and the decay of nuclei in large vessels,** p. 369–373
Pollak, L. W.: **Improvements to the condensation nuclei counter with photographic recording and the frequency distribution of nuclei counts,** p. 374–381

Colloquium on the Problems of Atmospheric Electricity

Wormell, T. W.: **Recent tendencies in research in atmospheric electricity,** p. 385–386
Koenigsfeld, L.: **Le gradient de potentiel en altitude (mesures obtenues par radiosondes),** [Potential gradient aloft: measurements obtained by radiosondes], p. 387
Norinder, H.: **Magnetic field variations caused by lightning in vicinity,** p. 388
Giorgi, M. and Molina, F.: **Sur les rapports entre le champ électrique et des masses d'air,** [Relation between the electric field and air masses], p. 389–391
Bossolasco, M.: **La durata dei lampi,** [Duration of lightning], p. 392–395. (*See* 6.10–280, Oct. 1955, *MAB*)
Kawano, M.: **The local anomaly in the atmospheric electric field in a large city,** p. 396
Mühleisen, R.: **On the deviations of the course of the atmospheric electrical elements above the continents from the world-wide course,** p. 397. (*See* 7.8–261, Aug. 1956, *MAB*)
Medi, E.: **Investigations on the distribution of electric charge in the atmosphere,** p. 398–400
Israël, H.: **Experimentelle Probleme in der luftelektrischen Synopsis,** [Experimental problems in atmospheric electricity synoptics], p. 401
Fedele, D. and Vittori Antisari, O.: **Enregistreur du champ électrique du type dynamique avec réduction de la mesure à zéro,** [Dynamic method of electric field recording with reduction of readings to zero], p. 402–404

Colloquium on Progress Studies in Meridional Large Scale Phenomena

Bjerknes, J.: **The transfer of angular momentum in the atmosphere,** p. 407–408
Palmén, E.: **The mean vertical-meridional circulation in low latitudes of the northern hemisphere,** p. 409–412
Charnock, H.: **Vertical transfer of momentum in the trades,** p. 413
Swinbank, W. C.: **An experimental study of eddy transports in the lower atmosphere,** p. 414. (*See* 6.9–148, Sept. 1955, *MAB*)
van Mieghem, Jaques: **Vorticity transport in the atmosphere,** p. 415–430
Flohn, H.: **Investigations on the general atmospheric circulation, especially in lower latitudes,** p. 431–442
Priestley, C. H. B.: **Large-scale transport studies from individual station data,** p. 443
Doporto, M.: **Meridional transport of angular momentum and sensible heat due to large-scale perturbations of the atmosphere,** p. 444–452
Montgomery, N. S.: **Meridional eddy flux of heat over Valentia Observatory,** p. 453–456
Lorenz, Edward N.: **A study of the general circulation and a possible theory suggested by it,** p. 457–462

Colloquium on Problems of Precipitation (Listed by title only. To be published in Procès-Verbaux of the I.U.G.G. Association of Hydrology), p. 465

Serra, L.: **Exposé d'ensemble,** [Summary of seminar]
Serra, L.: **Un nouveau type de pluviomètre pour l'enregistrement des précipitations en haute montagne,** [New type of rain gage for recording precipitation in high mountains]
Kasser, P.: **La répartition des précipitations des deux côtés d'une arête,** [Distribution of rainfall on both sides of an obstacle]
Poncelet, L.: **La comparaison des divers types d'installation pluviométrique,** [Comparison of various types of rain gage installations]
Mercanton, P. L.: **Les résultats obtenus au champ d'essai du Sentier (Jura Vaudois),** [Results obtained in the Sentier experimental field, Jura Vaudois]
Kasser, P.: **Un totalisateur à cardan placé sur un glacier,** [A gimbal totaliser installed on a glacier]
Serra, L.: **La précision des mesures pluviométriques,** [Accuracy of precipitation measurements]

Grunow, J.: **Die Niederschlagmessung mit Auffangflächen-Methode, Erfahrungen, Folgerungen,** [Precipitation measurements using the collector surface: method, experiences conclusions]

Russ, Mr.: **Die Niederschlagsverhältnisse in Deutschland seit 1881. Aushalt und Länge von Trocken- und Niederschlagsperioden,** [Precipitation conditions in Germany since 1881. Duration and trend in dry and rainy periods]

Pantoli, A.: **La normalité et la variabilité des séries pluviométriques centenaires en Italie** [Normalcy and variability of 100-year rainfall series in Italy]

Hiatt, Mr.: **Brief summary of activities and developments**

Levert, C.: **On the statistical theory of non-return and absence periods of rare phenomena (large daily rainfalls, heavy rains) and consideration of risk concerning practical application**

Yevdjewic, V.: **Séquence et fluctuations des années sèches et pluvieuses,** [Sequence and fluctuations of dry and rainy years]

Grunow, J.: **Bedeutung und Erfassung des Nebelniederschlags,** [Importance and determination of fog precipitation]

Hellstrom, B. and Arvidsson: **A note on dew in Egypt**

Perlat, A.: **Etudes dynamiques des précipitations,** [Dynamic study of rainfall]

Pramanik, S. K. and Rao, Y. P.: (1) **Hydrometeorology of Konyo catchment; (2) Hydrometeorology of the Damodar catchment**

Colloquium on Numerical and Dynamic Methods in Synoptic Meteorology

Frenkiel, F. N.: **Possibilities and significance of high-speed computing in meteorology (impressions from a National Science Foundation Symposium at UCLA),** p. 469–475

Bolin, B.: **Recent test with various models for numerical forecasting over 24 and 48 hours** p. 476

Sawyer, J. S.: **Some calculations of 24-hour changes of 500-mb height and 1000–500-mb thickness based on a two-parameter model atmosphere,** p. 477–496

Raethjen, P.: **The two types of sudden frontal cyclogenesis,** p. 497–500

Frenkiel, F. N.: **Application of numerical methods in studies of atmospheric pollution in industrial areas,** p. 501

Arnason, G. and Vuorela, L. A.: **A two-parameter representation of the normal temperature distribution of the 1000–500 mb layer,** p. 502. (*See* 7.5–157, May, 1956, *MAB*)

Welander, P.: **On the dispersion of conservative properties in an ideal fluid and its consequences with regard to numerical forecasting,** p. 503

Japan. Numerical Prediction Group: **Preliminary report on numerical prediction over the Far East,** p. 504. (*See* 6.11–144, Nov. 1955, *MAB*)

Colloquium on the Problems of the Mesosphere

Newell, H. E.: **Rocket data (pressure, temperature, winds),** p. 507. (Listed by title only)

Kaiser, T. K.: **Atmospheric data from the meteor,** p. 508. (Listed by title only)

Sheppard, P. A.: **The meteorological point of view on observational data in the mesosphere** p. 509–513

Scrase, F. J.: **Variations of temperature in the stratosphere up to 30 km over the British Isles** p. 514–517

Colloquium on Radiation in the Atmosphere

Mörikofer, W.: **The present state of radiation research,** p. 521–525

Möller, F.: **Actinometric determination of atmospheric turbidity,** p. 526–532

Ångström, Anders: **Actinometric measurements—performance and application,** p. 533–537

Cialdea, R.: **Un néphoscope photographique pour la polarisation de la lumière du ciel,** [Photographic nephoscope for the polarization of sky light], p. 538–539

Cialdea, R.: **La polarisation de la lumière du ciel diurne,** [Polarization of the light of the sky] p. 540–542.

Bener, P.: **Measurement of natural ultraviolet radiation by means of methods with spectral integration,** p. 543–548

Fritz, S.: **Scattering and absorption of solar energy by clouds of large water drops,** p. 549–55

Yamamoto, Giichi and Sasamori, Takashi: **Measurement of atmospheric radiation,** p. 55 (*See* 6.9–76, Sept. 1955, *MAB*)

Santomauro, L.: **Une méthode systématique d'emploi du nomogramme d'Elsasser pour la recherche de la variation du flux,** [Systematic method of using the Elsasser nomogram for investigating flux variation], p. 554–555

Cialdea, R.: **Les expéditions de l'Istituto Nazionale di Geofisica pour les observations géophysiques pendant les éclipses totales du soleil,** [Expeditions of the National Institute of Geophysics of Italy for geophysical observations during the total eclipses of the sun], p. 556–558

Colloquium on the Balance of Radiation in the Lower Stratosphere and the Substratosphere

Möller, F.: **A simplified method of computing the radiation balance in the troposphere,** p. 561–565
Strong, John: **New facts on planetary atmospheres,** p. 566–568
Curtis, A. R. and Goody, R. M.: **The effect of departures from Kirchhoff's law on stratospheric radiation calculations,** p. 569–570
Brewer, A. W. and Houghton, J. T.: **Observed radiation fluxes in the atmosphere at levels up to 12 km,** p. 571–576
King, J. I. F.: **The radiative equilibrium of a non-grey terrestrial atmosphere,** p. 577–581
Yamamoto, G.: **The radiative equilibrium of the earth's atmosphere: the line absorption case,** p. 582
Kaplan, L. D.: **The infra-red spectrum of the lower stratosphere and its importance in the heat balance,** p. 583–592
Godson, W. L.: **The computation of infra-red radiative transfer by atmospheric water vapour,** p. 593–594. (*See* 7.5–143, May, 1956, *MAB*)

Journal of Meteorological Research, Tokyo, Vol. 8, No. 4, June 1956

Otsuka, R.: **On the velocity of typhoons in autumn and their forecasting,** p. 181–188
Takenaga, K.; Osada, E. and Yamaguchi, K.: **On the analysis of Typhoon June (No. 5412), September 1954,** p. 189–204
Hirasawa, K.: **On the movement and weakening of the Typhoon June (No. 5412), September 1954,** p. 205–208
Yagi, H.; Watanabe, K.; Terauchi, E. et al: **On the Typhoon Marie (No. 5415) on September 1954,** p. 209–216
Yamaguchi, K.: **On the prediction of the typhoon intensity (Determination of the typhoon structure,** Pt. 1), p. 217–225
Suda, K.: **On the cold spell in the end of January, 1954,** p. 226–232
Kujirai, K.: **On the outbreak of the cold air in the third decade of January 1954,** p. 233–238
Otsuka, R.: **On the diameter of the eye of typhoon,** p. 239–240
Nagao, T.: **Characters of weather group and its application to long-range weather forecasting,** Pt. 10, p. 241–244
Matsuzawa, I.: **On the local wind, so-called "Yamase-Kaze" in Aomori Prefecture,** p. 245–247

Vol. 8, No. 5, June 1956

Suda, K.: **On the unusual coolness of June and July 1954,** p. 249–253
Ando, M.: **On the unusually cold weather during June and July 1954,** p. 254–262
Tanaka, B.; Ichikawa, T.; Yasui, H. and Furuichi, M.: **On the movement of typhoon Lorna (No. 5414) and others in September 1954,** p. 263–276
Takenaga, K. and Yamaguchi, K.: **On the circular isobars of a typhoon deformed by the mountain range,** p. 277–284
Saito, R.: **On the homogeneity of observed values of visibility,** p. 385–389
Nakajima, M.; Akita, I. and Kondo, G.: **A study of radiation shelter,** p. 290–300
Fujita, M.: **The seasonal weather forecastings at Tsushima based on oceanographical observations,** Pt. 2, p. 301–306
Ijuin, H.: **On the relation between full moon and air temperature,** p. 307–312
Yumada, S.; Otsubo, S.; Danjo, T. and Shirono, T.: **On the standards in the issue of fire warnings,** p. 313–319
Yajima, Y.: **On the response of meteorological instruments,** p. 320–324
Sato, Y.: **On the nocturnal temperature variation in and near the fruits orchards on a frosty night,** p. 325–326

Journal Scientifique de la Météorologie, Paris, Vol. 6, No. 24, Oct./Dec. 1954

Lhermitte, R.: **Transpondeur radar pour la mesure du vent,** [Transponder type radar for the measurement of wind], p. 123–131
Petit, M.: **Isolement thermique et barométrie en radiosondage,** [Thermal insulation and barometry in radio sounding], p. 133–149
Kiveliovitch, M. and Vialar, J.: **Quelques nouveaux tests pour l'étude des séries chronologiques,** [Some new tests for the study of chronological series, continuation], p. 151–166

Vol. 7, No. 25, Jan./March 1955

Gião, Antonio: **Essais de prévision numérique de la pression,** [Experiments in numerica prediction of pressure], p. 167–196

Elnesr, M. K.: **Appareil pour la mesure directe des gradients de l'humidité,** [Apparatus fo direct measurement of humidity gradients], p. 197–205

Dady, G.: **Note sur une méthode de prévision de trajectoires sur une surface isobare (500 mb** [On a method for forecasting trajectories on a 500 mb isobar surface], p. 207–210

Saissac, J.: **Sur la mesure de la diffusivité atmosphérique,** [On the measurement of atmospheri diffusiveness], p. 211–212

Leningrad. Glavnaia Geofizicheskaia Observatoriia, **Trudy,** Vol. 50, No. 112, 1955

Drozdov, O. A.: **O sviazi otnositel'noĭ vlazhnosti s kolichestvom i veroiatnost'iu osadkov,** [Rela tion between relative humidity and the probability and amount of precipitation], p. 3–15

Drozdov, O. A.: **O razlichiiakh v znacheniiakh temperatury i vlazhnosti v svobodnoĭ atmosfer v dni s osadkami i v dni bez osadkov,** [Differences in the temperature and humidity of th atmosphere on days with and without precipitation], p. 16–20

Orlova, V. V.: **Vlagooborot vegetationsionnogo perioda zasushlivogo goda v zapadnoi Sibiri Sviazi a groiskhozhdeniem,** [Moisture exchange of plant cover during a drought year i Western Siberia in relation to the source of precipitation], p. 21–38

Grigor'eva, A. S.: Vlagoovorot v razlivhnye gody na iuge Evropeiskoi Territori SSSR, [Th moisture exchange during the various years in the southern European regions of the USSR] p. 39–47

Berliand, T. G. and Efimova, N. A.: **Mesiachnye karty summarnoĭ solnechnoĭ radiatsii radiatsionnogo balansa territorii Sovetskogo Soiuza,** [Monthly charts of global radiatio and radiation balance in the U.S.S.R.], p. 48–82

Sakali, L. I.: **Vliianie brizovoĭ tsirkuliatsii na napriazhenie radiatsionnykh potokov,** [Effect o breeze circulation on radiation flux], p. 83–86

Lileev, M. V.: **Kharakteristika radiatsionnogo balansa i ego sostavnykh chasteĭ v raĭone Sverd lovska,** [Characteristics of the radiation balance and its components in the Sverdlovsk region], p. 88–110

Budyko, M. I. and Efimova, N. A.: **O tochnosti kart sostavliaiushchikh teplovogo balansa** [Accuracy of charts of the components of thermal balance], p. 111–119

Meteorological Society of Japan, Journal, Ser. 2, Vol. 34, No. 3, June 1956

Matano, H.: **On the role of the lateral mixing in the cyclostrophic flow pattern in the atmosphere** p. 125–135

Suda, K.: **A persistent cold-outbreak in the Far East related to the blocking situation,** p. 137–14

Kubota, S.: **A study of the extended forecasting with the barotropic model,** p. 147–157

Isono, K.; Komabayasi, M.; Yamanaka, Y. and Fujita, H.: **An experimental investigation o the growth of ice crystals in a super-cooled fog,** p. 158–163

Syono, S.; Gambo, K.; Miyakoda, K.; Aihara, M. and Manabe S.: **A note on the barotropi forecast using a moving coordinate system,** p. 164–168

Abe, T.: **A tentative analysis of wind wave data in view of the foaming of sea water, (A stud on the foaming of sea water, Pt. 11),** p. 169–175

Meteorologiia i Gidrologiia, Moscow, No. 7, July 1956

Gol'tsberg, I. A.: **Zashchita sel'skokhoziaĭstvennykh kul'tur ot zamorozkov,** [Protection o crops against frosts], p. 3–7

Gogoleva, E. I.: **Ispol'zovanie kart vlazhnosti dlia prognoza nizkoĭ oblachnosti,** [Use of humidity charts for forecasting low clouds], p. 8–13

Sadokov, V. P.: **K uchetu atmosfernykh frontov pri raschete izmeneniia davleniia v sredne troposfere,** [Calculation of pressure changes in the mid-troposphere, taking into accoun atmospheric fronts], p. 14–19

Bugaev, V. A. and Petrosiants, M. A.: **Orografiia i osadki Talasskoĭ doliny,** [Orography and precipitation in the Talass Valley], p. 19–22

Sakali, L. I.: **Rol' iasnoĭ pogody v formirovanii radiatsionnogo rezhima g. Odessy,** [Role o clear weather in the radiation regime of Odessa], p. 22–23

Duginov, V. I.: **Khod meteorologicheskikh elementov v period solnechnogo zatmeniia 30 iiuni 1954 g.v Kamennoĭ Stepi,** [Variations of meteorological elements during the solar eclipse of June 30, 1954 in Kamennaia Step'], p. 24–27

Zamorskii, A. D.: **Pasmurnoe nebo rozovogo tsveta,** [Pink cloudy sky], p. 27–28

Agupov, A. V.: **K voprosu ob otsenke kolebaniĭ vodonosnosti rek,** [Evaluation of river discharge variation], p. 28–31

Kheinson, M. R.: **Effekt ot ispol'zovaniia istoricheskogo raskhoda pri opredelenii raschetnykh maksimumov,** [Effect of the use of historical runoff data for determining empirical maxima], p. 32–34

Evgenov, N. I.: **Nekotorye voprosy terminologii morskikh l'dov,** [Problems in sea terminology], p. 34–36

Bogatyr', T. K.: **Ob opyte raboty agrometeorologicheskikh postov v kolkhozakh, sovkhozakh i MTS Ikrainskoĭ SSR,** [Experimental work of the agrometeorological stations on collective farms], p. 37–39

Danilin, A. I.: **Izmerenie vlazhnosti pochvy po osmicheskomu soprotivleniiu ugol'nykh elektrodov v steklovolokne, pomeshchennykh v pochvy,** [Soil moisture measurement by means of the resistance of carbon electrodes in glass wool inserted in the soil], p. 41–44

Lineĭkin, P. S.: **O sostoianii teorii okeanicheskikh techeniĭ za rubezhom,** [Theories of ocean currents in foreign countries], p. 45–51

Duvanin, A. I. and Lagutin, B. L.: [**Review of**] **K. K. Giul and V. M. Zhirnov: K voprosu ob osobennostiakh sovremennykh okeanograficheskikh issledovaniĭ,** [Peculiarities of modern oceanographic investigations], p. 52–53

Rudnev, G. V.: [**Review of**] **Rukovodstvo po kontroliu i obrabotke nabliudeniĭ nad fazami razvitiia sel'skokhoziaĭstvennykh kul'tur,** [Handbook for the control and compilation of observations on phases of development of agricultural crops], p. 53–55

Kosmin, I. D.: **Seminar bioklimatologov,** [Seminar of bioclimatologists], p. 61–62

Popov, A. V.: **Peredovoe gidrometeorologickeskoe biuro,** [A progressive hydrometeorological office], p. 62

Konkurs na razrabotku novykh meteorologicheskikh priborov, [Contest for the development of new meteorological instruments], p. 62–63

Ieteorologiia i Gidrologiia, Moscow, No. 8, Aug. 1956

Obrashchenie uchastnikov soveshchaniia aktiva rabotnikov gidrometeorologicheskoĭ sluzby SSSR ko vsem inzhenerno-tekhnicheskim i nauchnym rabotnikam, nabliudateliam, rabochim i sluzhashchim gidrometeorologicheskoĭ sluzhby Sovetskogo Soiuza, [Appeal by participants of the conference of the employees' committee of the Hydrometeorological Service of the USSR to all engineering-technical and scientific workers, observers, operators, and employees of the Hydrometeorological Service of the USSR], p. 3–8

Kashin, K. I. and M. V. Gritsenko: **Poverkhnost' nulevykh izmeneniĭ davleniia,** [Surface of zero pressure change], p. 9–13

Shekhtman, A. N.: **Solenost' vody Azovskogo moria pri izmenii ego vodnogo balansa,** [Salinity of the Sea of Azov during change in its water balance], p. 14–19

Budagovskiĭ, A. I. and Savina, S. S.: **Ispariaemost' s poverkhnosti rastitel'nogo pokrova,** [Evaporation from the vegetation cover], p. 20–23

Poliakova, E. A.: **Dal'nost' vidimosti v zone dozhdia,** [Range of visibility in an area of rain], p. 23–26

Dranevich, E. P.: **Opyt prognoza razvitiia advektivnykh tumanov nad Leningradskoĭ oblast'iu,** [Forecasting the development of advective fog in Leningrad Oblast], p. 26–28

Borisova, L. G.: **Makrosinopticheskie usloviia polozhitel'nykh anomaliĭ srednemesiachnoĭ temperatury vozdukha na Evropeiskoĭ territorii SSSR v mae-oktiabre 1954 goda,** [Macrosynoptic conditions of positive anomalies of mean monthly air temperatures in European Russia from May–Oct. 1954], p. 28–31

Doroshenko, F. D.; **O raskatakh groma,** [Thunder peak], p. 32

Arkhipova, E. P.: **Osobennosti termicheskogo rezhima pochvy na osushennykh bolotakh,** [Characteristics of the thermal regime of soils of drained swamps], p. 32–35

Oliferov, A. N.: **Agrometeorologicheskoe obosnovanie novykh metodov podgotovki pochvy pod lesnye nasazhdeniia v Vostochnom Krymu,** [The agrometeorological basis for new methods of preparing soils undergoing afforestation in Eastern Crimea], p. 35–37

Alekseev, G. A.: **Spriamlenie profiliia mestnosti iz usloviĭ ravenstva i minimuma ob"emov vyemok i nasypeĭ i opredelenie srednikh uklonov rek,** [Rectification of the profile of a locality from conditions of equality and the minimum volume of excavation and fill-in and the determination of the average grades of rivers], p. 37–39

Kotliarskiĭ, I. A. and Terterov, A. A.: **Selevye potoki na rekakh Kishchaĭ i Shinchaĭ,** [Flash erosion of the Kishchaĭ and Shinchaĭ Rivers], p. 39–40

Kurdina, T. N.: **K analizu srednedekadnykh temperatur vody v Rybinskom vodokhranilishche,** [Analysis of mean decadal water temperatures in the Rybinsk reservoir], p. 40–42

Fedorova, N. P.: **Nash opyt v agrometeorologicheskom obsluzhivanii vozdelyvaniia kukuruzy,** [Our experience with a meteorological service for corn growers], p. 43–45

Eremina, V. I.: **Opyt gidrometeorologicheskogo obsluzhivaniia stroitel'stva mosta cherez r. Ob' v Novosibirske,** [Experience with the use of hydrometeorological service in building the bridge across the Ob River at Novosibirsk], p. 45–46

Chistiakov, G. E.: **K ratsionalizatsii gidrometricheskikh rabot na bol'shikh rekakh,** [Increasing the efficiency of hydrometric operations on large rivers], p. 46–47

Letina, E. P.: **Metod povysheniia vysoty pod"ema radiozondov,** [A method of increasing the height of ascent of radiosondes], p. 48–50

Skibko, N. E.: **Zakidnoĭ probootbornik,** [A throw-type water sampler], p. 50–52

Afanas'ev, A. N. and Mamontov, I. V.: **Volnomernaia vekha na postoiannom osnovanii,** [Measuring rod on a permanent base], p. 52

Tverskoĭ, P. N.: [**Review of**] **S. P. Khromov and L. I. Mamontova: Meteorologicheskiĭ slovar',** [Meteorological Dictionary], p. 53–57

Literatura po meteorologii i gidrologii za 1955 g, [Literature on meteorology and hydrology in 1955], p. 57–58

Trudy nauchno-issledovatel'skikh uchrezhdenii gidrometsluzhby za 1955 g., [Publications of the scientific research institutions of the Hydrometeorological Service in 1955], p. 58–60

Khzmalian, K. S.: **Vazhnoe sobytie v zhisni gidrometeorologicheskoĭ sluzhby,** [Important event in the life of the Hydrometeorological Service], p. 61–65

Anapol'skaia, L. E.: **Mezhduvedomstvennoe soveshchanie po izucheniiu vetrovogo rezhima na territorii SSSR,** [Interdepartmental conference on the study of winds in the USSR], p. 65–66

Bitsilli, V. M. and Grinval'd, D. I.: **Konferentsiia po voprosam maksimal'nogo stoka,** [Conference on the question of maximum runoff], p. 66–67

Zakharov, V. N.: **Arkticheskaia konferentsiia,** [Arctic conference], p. 67

Nature, London, Vol. 178, No. 4534, Sept. 22, 1956

Beauchamp, R. S. A.: **The electrical conductivity of the head-waters of the White Nile,** p. 616–619

Block, Myron J.: **Surface tension as the cause of Bénard cells and surface deformation in a liquid film,** p. 650–651

Vol. 178, No. 4535, Sept. 29, 1956

Kaplan, Joseph: **United States programme for the International Geophysical Year,** p. 665–667

Sutton, O. G.: **Obituary** [**of**] **Dr. G. J. H. Swoboda,** p. 671–672

Deacon, E. L.: **The second purple light,** p. 688

Wark, David Q.: **A determination of the line-width of the λ6300 line of oxygen in the twilight sky,** p. 689–691

Vol. 178, No. 4536, Oct. 6, 1956

Legget, Robert F.: **Permafrost research in Northern Canada,** p. 716–717

Grayson, A. J.: **Effects of atmospheric pollution in forestry,** p. 719–721

Climatology in the service of man, p. 729–730

Scrimger, J. A. and Hunten, D. M.: **Observations of atmospheric sodium in absorption,** p. 753–754

Lenoble, J.: **Angular distribution of submarine daylight in deep water,** p. 756–757

Davies, O.: **African Pleistocene pluvials and European glaciations,** p. 757–758

Vol. 178, No. 4537, Oct. 13, 1956

Maling, D. H.: **Recent Antarctic research,** p. 773–775

Das, A. K.: **Effect of lightning discharges on magnetographs,** p. 815

Vol. 178, No. 4538, Oct. 20, 1956

Nonweiler, T.: **Seventh International Astronautical Congress,** p. 832–833

Wyndham, C. H. and Morrison, J. F.: **Heat regulation of MaSarwa (Bushmen),** p. 869–870

Vol. 178, No. 4539, Oct. 27, 1956

Bullard, Sir Edward: **Edmond Halley: the first geophysicist,** p. 891–892

Vol. 178, No. 4540, Nov. 3, 1956

Edholm, O. G.: **Physiology in the Polar regions,** p. 954–956
Delany, M. J. and Waterhouse, F. L.: **International Society of Bioclimatology and Biometeorology,** p. 966

Vol. 178, No. 4541, Nov. 10, 1956

Hopkinson, R. G.: **Light energy and brightness sensation,** p. 1065–1066
Jatar, D. P. and Sharma, H. D.: **Threshold potential for the low-frequency electric discharge in the air,** p. 1073
de Vries, D. A. and Webb, John: **Thermal conductivity of soil,** p. 1074–1075

Vol. 178, No. 4542, Nov. 17, 1956

Clegg, J. A.: **Rock magnetism,** p. 1085–1087

ceanographical Society of Japan, Tokyo, Journal, Vol. 11, No. 3, Oct. 1955

Tominaga, M.: **Studies on waves of finite amplitude,** p. 83–93
Takano, Kenzo: **Note on the convective circulation,** Pt. 3, p. 97–102
Yoshida, Kozo: **An example of variations in oceanic circulation in response to the variations in wind field,** p. 103–108
Watanabe, Nobuo: **On the temperature change in the upper layer in summer, (Hydrographic conditions of the north-western Pacific, Pt. 1),** p. 111–122
Suzuki, Yosio: **Observations of ice crystals formed on sea surface,** p. 123–126
Nagai, Masao: **A note on the annual variation of dissolved oxygen in sea water, Pt. 2,** p. 127–132

ptical Society of America, Journal, Vol. 46, No. 11, Nov. 1956

Richards, Paul I.: **Scattering from a point source in plane clouds,** p. 927–934
Theissing, H. H. and Caplan, P. J.: **Measurement of the solar millimeter spectrum,** p. 971–978
Taylor, J. H. and Yates, H. W.: **Infrared evidence for atmospheric ozone at sea level,** p. 998
Penndorf, Rudolf: **Total mie scattering coefficients for spherical particles of refractive index 2.00,** p. 1001

riroda, Moscow, Vol. 45, No. 10, Oct. 1956

Pamiati Otto Iul'evicha Shmidta, [In memory of Otto Iul'evich Shmidt], p. 3–4
Seifer, A. L.: **Protektornaia zashchita ot morskoĭ korrozii,** [Protection against sea water corrosion], p. 84–85
Danilova, N. A.: **Radiatsii v oktiabre,** [Radiation in October], p. 126–127
Dolgoshov, V. I.: **Front oseni,** [Autumn front], p. 127
Kemmerikh, A. O.: **Zamerzanie rek,** [River freeze-up], p. 127–128

rzegląd Geofizyczny, Warsaw, Vol. 1, No. 1, 1956

Pasławski, Zbigniew: **Wybitne wezbrania warty pod poznaniem i prawdopodobieństwo występowanie najwyższych rocznych stanów wody,** [Considerable rises of the Warta River by Poznan and the probability of appearance of the highest annual water levels], p. 5–14
Karasiński, Tadeusz: **Opady atmosferyczne w Tatrach,** [Atmospheric precipitation in the Tatra Mts.], p. 15–22
Lewińska, Janina: **Kierunki wiatrów w Polskich Tatrach,** [Wind directions in the Tatra Mts. in Poland], p. 23–26
Gurba, Anna: **O wielkości ochładzania w Zakopanem i na Kasprowym Wierchu: wyniki prowizoryczne,** [Range of the temperature drops at Zakopane and Kasprowy Wierch: provisional data], p. 27–30
Wirkus, Feliks: **Suwak do pośredniego obliczania wysokości powierzchni izobarycznych,** [A slide rule for the indirect calculation of the altitude of isobaric surfaces], p. 31–35
Kosiba, Aleksander: **O działaniu sił odchylających przy pradach atmosferycznych i wodnych na kuli ziemskiej: przyczynek do metodyki nauczania meteorologii,** [On the deflecting forces action on the air and water currents: a contribution to the teaching methods in meteorology], p. 37–47
Rojecki, Ananiasz: **Materiały dotyczące organizacji szkolenia specjalistów w zakresie nauk geofizycznych ze szczególnym uwzględnieniem meteorologii,** Pt. 2), [Material intended for instruction of specialists in the field of geophysical science with special attention to meteorology], p. 49–54

Chapman, Sydney: **Naukowy program Międzynarodowego Roku Geofizycznego 1957–1958,** [Scientific program of the International Geophysical Year 1957–1958], p. 55–66

Kosibowa, Stefania: **O badaniach wyższych warstw atmosfery ziemskiej,** [Studies of the upper layers of the earth's atmosphere], p. 67–76

Mikulski, Z.: **VI Kongres Międzynarodowej Asocjacji Badań Hydraulicznych (IAHR) w Hadze,** [6th Congress of the International Association for Hydraulic Research at the Hague], p. 77–79

Rojecki, A.: **Międzynarodowa Konferencja Poświęcona "meteorologii stosowanej" w Obertraun (Austria),** [International Conference at Obertraun, Austria, dedicated to "applied meteorology"], p. 79–80

Pieślak, Z.: **Międzynarodowy atlas chmur,** [International cloud atlas], p. 80–81

Centkiewicz, Cz.: **Nowy typ radiosondy,** [New type of radiosonde], p. 81–83

Mikulski, Z.: **Konferencja oceanograficzna w 1956 Roku w Paryzu,** [Oceanographical Conference, 1956, in Paris], p. 83

Rivista di Meteorologia Aeronautica, Rome, Vol. 16, No. 2, April/June 1956

Bilancini, Raoul: **Le macchie solari e il tempo,** [Sunspots and weather], p. 3–14

Fea, Giorgio: **Adiabatiche reversibili per aria satura,** [Reversible adiabatics for saturated air], p. 15–20

Giacomelli, Raffaele: **Terminologia di idrometeore: nevischio, nebbia, foschia, caligine, galaverna, calabrosa, vetrone, gragnola e neve tonda,** [Terminology of hydrometeors: snow grains, fog, damp haze, dry haze, soft rime, hard rime, glaze, small hail and snow pellets], p. 21–36

Bernacca, Edmondo: **Il tempo in Italia nel trimestre gennaio-marzo 1956,** [Weather in Italy, Jan./March 1956], p. 37–39

Bilancini, Raoul: **Cent'anni di previsione del tempo in Francia,** [One hundred years of weather forecasting in France], p. 61–62

Bilancini, Raoul: **Lo strano inverno del 1956,** [Strange winter of 1956], p. 62

Bilancini, R.: **La polvere meteorica e la pioggia,** [Meteoric dust and fog], p. 62–63

Pellisari, L.: **Palloni sonda transoceanici,** [Transoceanic radio sonds], p. 63–64

Pellisari, L.: **Palloni sonda meteorologici di alta quota,** [High frequency meteorological radiosondes], p. 64

Pellisari, L.: **Nuovo aeroplano radar-meteorologico americano,** [New American radar-meteorological aeroplane], p. 64–65

Pellisari, L.: **Il ghiaccio secco contro gli uragani,** [Dry ice in hurricane prevention], p. 65

Pellisari, L.: **Semina di nubi e aumento di precipitazioni,** [Cloud seeding and increase of precipitation], p. 65

Bilancini, Raoul: **Previsioni meteorologiche per telefono,** [Meteorological forecasting by telephone], p. 65

Radiodiffusione dei bollettini meteorologici nel Canadà, [Radio transmission of meteorological bulletins in Canada], p. 65

Vol. 16, No. 3, July/Sept. 1956

Messina, Vittori; Palmieri, Sabino; Pellegrini, Francesco; Simonetti, Dono and Todaro, Cosimo: **Evoluzione ciclonica al suolo e divergenza alla quota del getto nelle applicazioni sinottiche,** [Synoptic applications of cyclone development at ground level and divergence at the height of the jet stream], p. 3–21

Gazzola, Adriano: **Sulla variazione con la quota del parametro l^2 in situazioni di onde da rilievo,** [Variation with altitude of the parameter l^2 in orographic wave situations], p. 21–30

Bernacca, Edmondo: **Degli avvenimenti meteorologici più importanti verificatisi in Italia nel periodo gennaio-giugno 1956,** [Most outstanding meteorological events in Italy, Jan.–June, 1956], p. 31–36

Bilancini, R.: **La lotta contro gli uragani negli Stati Uniti,** [Fight against hurricanes in the United States], p. 59–60

Bilancini, R.: **Gli aerei americani nella campagna contro gli uragani,** [The American airplanes in the campaign against hurricanes], p. 60–61

Bilancini, R.: **La chemosfera,** [The chemosphere], p. 61–62

Bilancini, R.: **La corrente a getto si complica,** [The jet stream becomes intricate], p. 62

Bilancini, R.: **La tempesta del febbraio 1955 sul Golfo di Genova,** [The storm of Feb. 1955 in the gulf of Genoa], p. 62–63

Pellisari, L.: **Stazioni meteorologiche automatiche,** [Automatic weather stations], p. 63

Bilancini, R.: **Calcolatrici elettroniche e previsioni,** [Electronic computers and forecasting], p. 63

B., A.: **Nuove tecniche d'indagine meteorologica,** [New techniques in meteorological research], p. 63

Bilancini, R.: **Un importante periodico meteorologico,** [An important meteorological journal], p. 64

ymposium on Artificial Rain, New Delhi, Feb. 1953, Proceedings and papers of Symposium held under joint auspices of Atmospheric Research Committee, CSIR, and India Meteorological Dept. New Delhi, Council of Scientific and Industrial Research, 1955

Sohoni, V. V.: **Introductory address,** p. 1–5

Bhatnagar, S. S.: **Inaugural address,** p. 6–8

Finch, G. I.: **Epitaxial crystal growth** (abstract), p. 9

Basu, S. and Das, P. K.: **Some aspects of the growth of cloud droplets by coalescence,** p. 10–18

Krishna Rao, P. R. and Ganesan, V.: **On the formation and physical properties of clouds over Madras,** p. 19–32

Krishna Rao, P. R. and Ganesan, V.: **Rain from non-freezing clouds over Madras,** p. 33–39

Banerji, S. K. and Mukherji, A. K.: **On methods of exciting nature's process for production of rain,** p. 40–77

Roy, A. K.: **Experiments on precipitation control and evaluation of their results,** p. 78–87

Ramdas, L. A.: **Methods of testing the efficacy of experiments on artificial rain-making,** p. 88–91

Mull, S. and Chakravarty, K. C.: **Suitability of rain-making methods in different parts of India during various seasons,** p. 92–103

Pramanik, S. K. and Koteswaram, P.: **Heights of tops of low clouds over India,** p. 104–111

Satakopan, V. and Sen, B. K.: **Distribution of dry cloudy days in India,** p. 112–120

Rao, Y. P. and Desai, B. N.: **Possibilities of artificial rain in the states of Bombay, Saurashtra and Kutch,** p. 121–126

Ramanathan, K. R.: **Organization required for planned experiments on artificial rainfall in India,** p. 127–128

Abstracts of other papers, p. 129–131

Recommendations on artificial rain experiments by the Atmospheric Research Committee, p. 132–134

Selective bibliography on artificial rain, p. 135–148

eitschrift für Meteorologie, Berlin, Vol. 10, No. 8, Aug. 1956

Matzke, H. and Schmidt, K. H.: **Beitrag zum UV-Strahlungsklima der südlichen Ostseeküste,** [Contribution to the UV radiation climate of the southern Baltic coast], p. 225–238

Schmelovsky, Karl-Heinz: **Partielle Reflektionen in schwachen troposphärischen Wellenleitern,** [Partial reflections in weak tropospheric wave-ducts], p. 230–243

Berger, M.: **Beeinflussung des luftelektrischen Potentialgefälles durch meteorologische Erscheinungen,** [Influence of atmospheric potential gradient by meteorological phenomena], p. 244–249

PART IV. AUTHOR AND SUBJECT INDEXES

In this section will be found references to the number given at the head of each abstract or entry. In Part I each entry begins with the number 8.1, and in Part II in the Bibliography on Solar Relations with Weather each entry begins with the number and letter 8A. This index is divided into three parts:

Index of Authors | Index of Subjects | Index of Geographic Locations

INDEX OF AUTHORS

Abbot, C. G., 8A–5, 8A–14, 8A–24, 8A–25, 8A–36, 8A–54, 8A–57, 8A–73, 8A–91, 8A–92
Abetti, G., 8A–11
Acta Hydrophysica, Berlin, 8.1–72
Ahmad, Salah-Ud-Din, 8.1–334
Akehurst, C., 8.1–154
Alaska Univ. Geophysical Inst., 8.1–84
Allen, H. G., 8.1–135
American Meteorological Society, 8.1–52
Anderson, L. J., 8.1–393
Anderson, W., 8.1–381
Andrews, J. F., 8.1–204
Anosova, L. S., 8.1–319
Arabadzhi, V. I., 8.1–378
Arakawa, H., 8.1–347
Archenhold, G., 8A–101, 8A–104
Arlery, R., 8.1–327
Assmann, D., p. 120
Aubertin, J. J., 8.1–209
Aujeszky, L., 8.1–1
Australia. Meteorological Branch, 8.1–314

Bac, S., 8.1–302
Bacsó, N., 8.1–1
Bagge, E., 8.1–225
Balasubramanian, C., 8.1–384
Banerjee, R. C., 8.1–374
Bannon, J. K., 8.1–177
Barbier, D., 8A–27
Barlow, E. W., 8.1–56
Bartels, G., 8.1–181
Bartels, J., 8.1–84
Bartnicki, L., 8.1–21
Basu, S., 8.1–22
Batta, E., 8.1–93
Bauer, L. A., 8A–98, 8A–99
Baur, F., 8A–30, 8A–37
Bayliss, J. M., 8.1–369
Becker, F., 8.1–4
Beenhouwer, O., 8.1–157
Békéssy, A., 8.1–1
Beleke, H., 8,1–4
Béll, B., 8.1–1
Berg, Hellmut, 8A–106
Berkes, Z., 8.1–1, 8A–107
Berlage, H. P., Jr., 8A–72, 8A–78
Bernard, P., 8A–71
Bertels Menschoy, A., 8.1–342
Birand, H., 8.1–337
Blackwell, M. J., 8.1–158
Blandin Landivar, C., 8.1–315
Blizniak, E. V., 8.1–9
Block, L., 8.1–388
Bok, B. J., 8.1–113
Bollinger, C. J., 8A–89
Bonchkovskaia, T. V., 8.1–355
Bouchet, R., 8.1–173
Bouman, D. J., 8.1–144
Bouman, M. A., 8.1–365
Bowden, D. T., 8.1–275
Boyko, H., 8.1–335
Bradbury, D. L., 8.1–190
Brandejs, S., 8.1–115, 8.1–161
Braun, G., 8A–66
Breistein, P. M., 8.1–191
Bretschneider, C. L., 8.1–67
Brochet, P., 8.1–94
Brooks, C. E. P., 8A–4 to 8A–6, 8A–15, 8A–21, 8A–32, 8A–61, 8A–85, 8A–86, 8A–102
Brown, R., 8.1–80
Brun, R. J., 8.1–87, 8.1–88
Brunner-Hagger, W., 8A–114
Buettner, K., 8.1–139, 8.1–140
Bullig, H.-J., 8.1–73
Bumba, V., 8.1–359
Burke, C. J., 8.1–61
Burke, H. N., 8.1–44
Burt, W. V., 8.1–63
Bushby, F. H., 8.1–169
Byers, H. R., 8.1–5

C—, C. A., 8.1–338
Cabannes, J., 8A–27
Cammerer, J. S., 8.1–105
Camões, L. de., 8.1–209
Carnegie Inst. of Washington, 8.1–37
Central Sierra Snow Lab., 8.1–325
Ceplecha, Zd., 8.1–175
Cermak, J. E., 8.1–261
Chalmers, J. A., 8.1–386
Chapman, S., 8.1–23
Charney, J. G., 8.1–192
Chepil, W. S., 8.1–250
Chew, R. M., 8.1–344
Chicago. Univ. Dept. of Met., 8.1–190, 8A–83
Chree, C., 8A–2
Chvojková, E., 8.1–394
Cicala, A., 8.1–170
Clayton, G. D., 8.1–363
Clayton, H. H., 8A–16, 8A–53, 8A–60
Clough, H. W., 8A–3, 8A–12, 8A–23
Cohen, J., 8.1–57
Coleman, T. L., 8.1–89
Colorado Agricultural and Mechanical College. Dept. of Civil Engr., 8.1–261
Conference on the Scientific Basis of Weather Modification Studies, Univ. of Arizona, Tucson, 8.1–5
Contract AF 19(122)-33, 8.1–135
Contract AF 19(122)-153, 8.1–187, 8.1–196
Contract AF 19(122)-375, 8.1–268
Contract AF 19(604)-41, 8.1–243
Contract AF 19(604)-409, 8.1–136
Contract AF 19(604)-449, 8A–113, –117
Contract AF 19(604)-503, 8.1–84

Contract AF 19(604)-545, 8.1–134, 8.1–137
Contract AF 19(604)-640, 8.1–221
Contract AF 19(604)-1025, 8.1–257
Contract AF 19(604)-1293, 8.1–190
Contract AF 19(604)-1305, 8.1–258
Contract AF 61(514)-743-C, 8.1–386
Contract CCA, 8.1–90
Contract DA-36-034-ORD-1023, 8.1–162
Contract N6ori-02036, 8A–83
Contract N9onr-82401, 8.1–261
Contract Nonr:285(09), 8.1–186
Corby, G. A., 8.1–241
Court, A., 8.1–34
Coxon, A., 8.1–276
Craddock, J. M., 8.1–228
Craig, R. A., 8A–33, 8A–34
Cronin, H. E., 8.1–221
Csizsinsky, M., 8.1–1
Culkowski, W. M., 8.1–171
Current Science, 8.1–104
Currie, B. W., 8.1–14
Curtis, J. D., 8.1–352
Curtis, R., 8.1–257
Czajka, W., 8.1–328

Daigo, Y., 8.1–229
Darlington, C. R., 8.1–64
Daubert, K., 8.1–4
Day, G. J., 8.1–280
Decker, W. L., 8.1–16, 8.1–17
Dedebant, G., 8.1–118
Déjardin, G., 8A–27
Deland, R., 8.1–257
Delcambre, E., 8A–5
Denisov, P. S., 8.1–336
de Pasquale, O., 8.1–198
Dési, F., 8.1–1
Deslandres, H., 8A–5
Deutsche Antarktische Expedition 1938/1939, p. 120
Die Erde, p. 120
Dinsdale, F. E., 8.1–283
Dirmhirn, I., 8.1–310
Ditchburn, R. W., 8.1–220
Dmitriev, A. A., 8.1–355
Domanevskiĭ, N. A., 8.1–10
Drobilová, L., 8.1–119
Dublin, M., 8.1–180
Dué Rojo, A., 8.1–231
Duell, B., 8A–13, 8A–74
Duell, G., 8A–74
Dufay, J., 8A–27
Durbin, W. G., 8.1–267
Durham Univ., 8.1–386
Duvdevani, S., 8.1–272
Dzerdzeevskiĭ, B. L., 8.1–324

Ecuador. Servicio Met., 8.1–315
Eigenson, M. S., 8A–28, 8A–38
Eklund, B., p. 120
Elliott, F. E., 8.1–61
Evans, D. C., 8.1–371

Fan, C. Y., 8.1–387
Farthing, E. D., 8A–45 to 8A–47, 8A–49, 8A–80, 8A–95, 8A–115
Faucher, G., 8.1–382
Faust, H., 8.1–101, 8A–81
Fetner, M. W., 8.1–89
Firsoff, V. A., 8.1–174
Fish, G. V., 8.1–247
Fisher, E. L., 8.1–186
Fishkova, L., 8.1–222
Fjørtoft, R., 8.1–163
Flohn, H., 8A–77, 8A–105
Flora, S. D., 8.1–252
Flórián, E., 8.1–1
Foster, J. A., 8.1–134
France. Centre National de la Recherche Scientifique, 8A–27
Frank, S. R., 8.1–182
Frankcom, C. E. N., 8.1–74
Franklin Inst. Laboratories for Research and Development, Phila., 8.1–135
Fujiwara, S., 8.1–155, 8.1–206
Fukunaga, M., 8.1–300
Fukushima, Japan. Weather Station, 8.1–299
Fukutomi, T., 8.1–145
Funahashi, Y., 8.1–238
Fuss, F., 8.1–95

Gaál, E., 8.1–1
Garrigue, H., 8A–27
Garwick, J. V., 8.1–110
Gazzola, A., 8.1–193
Gellert, J. F., 8.1–18
Geografisk Tidssdrift, Copenhagen, 8.1–53
Geo-Science, Inc., Washington Grove, Md., 8.1–221
Giever, P. M., 8.1–363
Götz, P., 8A–27
Goldberg, P. G., 8.1–382
Golding, E. W., p. 120
Gopalrao, M. S. V., 8.1–356
Gossard, E. E., 8.1–393
Graystone, P., 8.1–120
Gt. Brit. Hydrographic Dept., 8.1–75
Greenfield, S. M., 8.1–383
Greenhow, J. S., 8.1–254
Gregor, A., 8.1–51, 8.1–307, 8.1–329
Gregor, Z., 8.1–199
Grenet, G., 8.1–85
Gucker, F. T., Jr., 8.1–268

Haas, H. W., 8.1–136
Hagen, J. P., 8.1–133
Hamilton, R. A., 8.1–146
Hansel, C. E. M., 8.1–57
Hanzlík, S., 8A–58, 8A–67, 8A–87
Harper, W. G., 8.1–121
Harrower, T. N. S., 8.1–371
Harry, W., 8.1–4
Hart, G., 8.1–207
Harvard Univ. Harvard College Obs., 8.1–113
Hawkins, H. F., 8.1–194
Hay, R. F. M., 8.1–123, 8.1–276
Haynes, B. C., 8.1–364
Heastie, H., 8.1–255
Helland-Hansen, B., 8A–1
Helliwell, N. C., 8.1–260
Hershfield, D. M., 8.1–289
Hille, A., 8.1–1
Hirata, T., 8.1–294, 8.1–295
Höhne, W., 8.1–141
Hövermann, J., 8.1–298
Hofmann, A., 8.1–12
Hofmann, G., 8.1–147
Hogg, W. H., 8.1–303
Holdgate, M. W., 8.1–32
Holland, J. Z., 8.1–249
Hornstein, R. A., 8.1–208
Houghton, H. G., 8.1–5
Hounam, C. E., 8.1–209
Howard, B., 8.1–97
Hubbard, C. T., 8.1–296
Inawashiro, Japan. Weather Station, 8.1–299

Indian Journal of Meteorology and Geophysics, Delhi, 8.1–288, 8.1–293
Indiana. Univ. Dept. of Chemistry, 8.1–268
International Council of Scientific Unions, 8A–5
International Union of Geodesy and Geophysics. Assoc. of Met., Rome, 8.1–2
Inst. for Advanced Study, Princeton, N. J., 8.1–162
Izawa, T., 8.1–200

Jacchia, L. G., 8.1–360
Jackson, J. E., 8.1–379
Jacobsen, N. K., 8.1–53
James, D. G., 8.1–281
James, P. E. (*ed.*), 8.1–61
Jatho, A., 8A–19
Jensen, J., 8.1–210
Jensen, K. M., 8.1–163
Jílek, J., 8.1–262
Johnson, D. H., 8.1–172
Jones, C. F. (*ed.*), 8.1–61
Jones, D. L., 8.1–257
Joseph, E. J., 8.1–195

Kacvinský, M., 8.1–263
Kadocsa, F., 8.1–1
Kaiser, T. R., 8.1–254, 8.1–361
Kakas, J., 8.1–284
Kalinina, T. A., 8.1–355
Kangieser, P. C. (*trans.*), 8.1–213
Karapiperis, L., 8A–70, 8A–96
Kato, Y., 8.1–85
Keller, G., 8.1–243
Kendrew, W. G., 8.1–14
Kéri, M., 8.1–284
Kerley, M. J., 8.1–260
Khrgian, A. Kh., 8.1–278, 8.1–279
Kimpara, A., 8.1–389
Kinoshita, M., 8.1–259
Kir'iashkina, Z. I., 8.1–138
Kirkman, J. R., 8.1–386
Kleiman, V. S., 8.1–349
Klinker, L., 8.1–397
Knepple, R., 8.1–224
Kobayashi, T., 7.8–108
Kodera, S., 8.1–253
Koenigsfeld, L., 8.1–377
Kojima, K., 8.1–297
Kolobkov, N. V., p. 120
Kon, Y., 8.1–246
Konček, M., 8.1–48, 8.1–304
Kopcewicz, T., 8.1–148
Koppe, H., 8A–35
Korhonen, V. V., 8.1–49
Kőrösi, G., 8.1–1
Kondo, G., 8.1–376
Koteswaram, P., 8.1–201
Kraus, J. D., 8.1–111
Křivský, L., 8.1–199, 8.1–390, 8A–93
Krizer, R. E., 8.1–336
Kruhl, H., 8.1–183
Krukovskais, Z. V., 8.1–349
Krustanov, L., 8.1–282
Kümmel, H., 8.1–4
Kuffel, E., 8.1–270
Kuhnke, W., 8.1–4
Kuiper, G. P. (*ed.*), 8.1–62
Kulin, I., 8.1–1
Kullmer, C. J., 8A–63, 8A–68
Kuroiwa, D., 8.1–273
Kusakabe, M., 8.1–96
Kusama, S., 8.1–285

Lauter, E. A., 8.1–181, 8.1–397
Lawrence, E. N., 8.1–211
Lederer, J., 8.1–39
Lee, M. A., 8.1–33
LeMaitre, R. W., 8.1–32
Lenoble, J., 8.1–71
Lettau, H., 8.1–382
Levina, E. F., 8.1–349
Leviton, R., 8.1–116, 8.1–143
Lin, P. N., 8.1–261
Link, F., 8.1–176
Logvinov, K. T., p. 120
London, J., 8A–116
Lott, G. A., 8.1–290
Ludlam, F. H., 8.1–269

MacDowall, J., 8.1–149
Macfarlane, W. V., 8.1–97
Machado, E. A. M., 8.1–118
McIntosh, D. H., 8A–39
Mackenzie, J. K., 8.1–260
MacLulich, D. A., 8A–17
McMillin, B., 8.1–212
McWhorter, J. C., 8.1–316
Madjalah Ilmu Alam Untuk Indonesia, 8.1–24
Maeda, H., 8.1–380
Mäde, A., 8.1–141
Maggio Peña, G., 8.1–315
Majdanowski, S., 8.1–321
Maksimov, I. V., 8A–44
Malan, D. J., 8.1–385
Malta. Met. Service, 8.1–126
Malurkar, S. L., 8.1–179
Manning, B., 8.1–382
Marcilonek, S., 8.1–302
Marine Observer, 8.1–69, 8.1–124, 8.1–366 to 8.1–368, 8.1–372, 8.1–373, 8.1–375
Markgraf, H., 8.1–213
Masatsuka, A., 8.1–285
Massachusetts Inst. of Technology. Dept. of Met., 8.1–187, 8.1–196, 8.1–258
Mather, J. R., 8.1–264, 8.1–330
Matyshevskiĭ, G. V., 8.1–214
Mauchly, J. W., 8A–94
Maximon, L. C., 8.1–70
May, E. F., 8.1–57
Mazin, I. P., 8.1–279
Medvedev, V. P., 8.1–305
Meinel, A. B., 8.1–387
Menzel, D. H., 8A–27
Mercanton, P.-L., 8.1–150
Meteorological Magazine, 8.1–142, 8.1–370
Meyer, O., 8.1–86
Michaelis, E. G., 8.1–226
Michalczewski, J., 8.1–235
Michigan. Univ. Engr. Res. Inst., 8.1–134, 8.1–137
Milerova, A., 8.1–357
Miller, A., 8.1–257
Mills, C. A., 8.1–102
Misselwitz, W., 8.1–151
Mitra, S. K., 8A–27
Mixsell, J. W., 8.1–325
Mollwo, H., 8.1–159
Morello, J., 8.1–265
Morgan, G. W., 8.1–66, 8.1–70
Mori, K., 8.1–219
Morris, R. J., 8.1–97
Morton, W. C., 8A–117
Mrose, H., 8.1–99
Munkelt, K., 8.1–109
Murray, R., p. 120

Nakamura, N., 8.1–203
Nakano, K., 8.1–100
Nansen, F., 8A–1
Narayanan, J., p. 120
Nathan, H. A. G., 8.1–105
Nechaev, I. N., 8.1–132
Németh, T., 8A–108
Neuberger, H., 8A–103
Neufeld, E. L., 8.1–254
New Mexico. College of Agriculture and Mechanic Arts. Physical Sci. Lab., 8.1–136
New York. Univ. College of Engr. Res. Div., 8.1–186
Newman, M. M., 8.1–392
Nicolet, M., 8A–26, 8A–27
Nielsen, A. W., 8.1–163
Nogami, K., 8.1–240
Noguchi, K., 8.1–232, 8.1–237
Nolan, P. J., 8.1–152, 8.1–270
Nordø, J., 8A–79
Norske Inst. for Kosmisk Gysikk, 8.1–114
Norway. Met. Inst., 8.1–127 to 8.1–129
Nosova, V. A., 8.1–138
Numata, T., 8.1–244
Nyasaland. [Met. Service], 8.1–130

O'Connor, T. C., 8.1–152
Oddie, B. C. V., 8.1–267
Ogawara, M., 8.1–164, 8.1–291
Ohio State Univ. Res. Foundation, 8.1–243
Okuda, M., 8.1–85
Onishi, G., 8.1–189
Ossaka, J., 8.1–85
Ota, Y., 8.1–215
Ozeki, K., 8.1–76
Ozorai, Z. (*trans.*), 8.1–242

Paetzold, H.-K., 8.1–178
Pal'gov, N. N., 8.1–81
Pallot, A. C., 8.1–106
Panofsky, H. A., 8.1–257
Papadakis, J., 8.1–331
Parde, M., 8.1–301
Parmele, O. S., 8.1–34
Paroczay, E., 8.1–186
Parry, H. D., 8.1–191
Parthasarathy, K., 8.1–292
Parthasarathy, S., 8.1–201
Parziale, A. J., 8.1–382
Pataleev, A. V., 8.1–239
Pavlova, E. N., 8.1–222
Pavlova, N. P., 8.1–349
Péczely, G., 8.1–1, 8.1–233
Peerlkamp, P. K., 8.1–15
Peisino, G., 8A–97
Pennsylvania. State Univ. Mineral Industries Experiment Sta. Dept. of Met., 8.1–257

Peppler, A., 8A–82
Peters, H. F., 8.1–98
Peterson, R. E., 8.1–186
Petitjean, L., 8A–65
Petrovič, S., 8.1–230
Phillips, O. M., 8.1–184
Picko, V., 8.1 340
Pidgeon, F. D., 8.1–271
Pinna, M., 8.1–353
Polli, S., 8.1–320, 8.1–332, 8A–29, 8A–48
Poppen, J. R., 8.1–103
Portig, W., 8.1–77, 8.1–311
Postma, K. R., 8.1–216
Powell, B. W., 8.1–226
Powell, D. B. B., 8.1–158
Prager, E., 8.1–78
Pratt, R. L., 8.1–343
Predmerszky, T., 8.1–345
Primault, B., 8.1–326
Project ANDB 4.14, 8.1–364
Project NR 082–120, 8A–83
Prudhomme, A., 8A–31
Przegląd Meteorologiczny i Hydrologiczny, 8.1–36, 8.1–50

Quayle, E. T., 8A–88
Quintela, R. M., 8.1–346

Raab, L., 8.1–153
Raethjen, P., 8.1–6
Rajkai, Ö., 8.1–1
Ramachandra Rao, B., 8.1–356
Ramakrishnan, K. P., p. 120
Ramaswamy, C., 8.1–202
Randall, J., 8.1–217
Regula, H., 8.1–308
Reichelderfer, F. W., 8.1–39
Reid, R. O., 8.1–67
Rein, F., 8.1–333
Reiter, R., 8.1–122, 8A–40
Réthly, A., 8.1–47
Reymann, G., 8.1–165
Rickmann, L., 8.1–4
Riehl, H., 8A–83
Robinson, E. F., 8.1–195
Rodewald, M., 8.1–73, 8.1–79, 8A–82
Rodhe, B., 8.1–56
Rodionov, S. F., 8.1–222
Roman, W., 8.1–154
Rosini, E., 8.1–317
Rubin, M. J., 8.1–205, 8A–117
Rusin, N. P., 8.1–185

Saidek, B., 8.1–309
Salisbury, W. W., 8A–27
Samardzhiev, D. T., 8.1–282
Samoilov, I. V., 8.1–45
Sanders, F., 8.1–258
Sandman, H. E., 8.1–13
Sapozhnikova, S. A., 8.1–336
Sauberer, F., 8.1–82
Saucier, W. J., p. 121
Saunders, W. E., 8.1–277
Sawairi, S., 8.1–215
Sawyer, J. S., 8.1–283
Schell, I. I., 8A–69, 8A–117
Scherhag, R., 8A–75
Schmidt, G., 8.1–160
Schmidt, M., 8.1–141
Schmuck, A., 8.1–266
Schnelle, F., 8.1–7
Schonland, B. F. E., 8.1–385
Schulte, H. F., 8.1–134, 8.1–137
Schumann, T. E. W., 8.1–125
Schwerdtfeger, W., 8.1–350
Science, Wash., D. C., 8.1–83
Septer, E., 8A–100
Serra, A., 8.1–234
Seydl, O., 8.1–58, 8.1–59
Shapiro, R., 8A–41, 8A–84
Shaw, P. J. R., 8.1–323
Shcherbakov, I. P., 8.1–349
Shepperson, G., 8.1–348
Shimoda, S., 8.1–155
Shmoys, J., 8.1–395
Sholokhova, E. D., 8.1–222
Shostakovich, V. B., 8A–7 to 8A–10
Shulgin, A. M., 8.1–336
Shumskiĭ, P. A., 8.1–274
Siadek, B., 8.1–286
Sicinski, H. S., 8.1–134
Sida, D. W., 8.1–362
Sierra Leone. Met. Service, 8.1–131
Šimaljak, J., 8.1–357
Skaar, J., 8.1–20
Skeib, G., 8.1–181, 8.1–358, 8.1–391
Sládek, J., 8.1–351
Smith-Rose, R. L., 8.1–112
Smoliak, S., 8.1–98
Sneyers, R., 8.1–117
Sonnblick-Verein, Vienna, 8.1–35
Sonntag, D., 8.1–156
Spain. Inst. Nacional de Geofísica, 8.1–42
Spar, J., 8.1–186
Sparger, C. R., 8.1–68
Sperry Gyroscope Co., Inc., 8.1–90
Sprenger, K., 8.1–181
Stakmann, J. R., 8.1–392
Starkey, B. J., 8.1–396
Starr, V. P., 8.1–187, 8.1–196
Steinhauser, F., 8.1–35, 8A–63, 8A–90
Stempnevskiĭ, V. M., 8.1–274
Stetson, H. T., 8A–20
Storer, H., 8.1–248
Straube, G., 8.1–4
Sugawa, A., 8.1–145
Sugawa, C., 8A–109
Sumi, T., 8.1–256
Suzuki, E., 8.1–287
Suzuki, Y., 8.1–229
Svarchevskiĭ, V. N., 8.1–132
Svatenko, I. D., 8.1–251
Sverdrup, H. U., 8.1–62
Swales, M. K., 8.1–32
Symposium on Artificial Rain, New Delhi, 8.1–3; p. 121
Szilágyi, T., 8.1–1

Takács, L. (*ed.*),8.1–1
Takahashi, K., 8.1–11
Tanaka, S., 8.1–253
Tanizawa, T., 8.1–253
Tcheng, M.-L., 8A–27
Teich, M., 8.1–242
Terry, R. D., 8.1–54
Tetrode, P., 8A–22, 8A–55
Thielert, R., 8.1–225
Thompson, D. Q., 8.1–341
Thomson, A., 8.1–312, 8A–18
Thornthwaite, C. W., 8.1–157
Tilton, L. W., 8A–64
Tomatsu, K., 8.1–164, 8.1–287
Trans World Airlines, Inc., 8A–47
Tricart, J., 8.1–338
Tromso, Norway. Nordlys-Observatoriet, 8.1–114
Tullström, H., 8.1–322
Turner, R. C., 8.1–381

Uchikawa, K., 8.1–376
Ungeheuer, H., 8.1–4
U. S. Air Navigation Development Board, 8.1–90
U. S. Air Weather Service, 8.1–91
U. S. Atomic Energy Commission, 8.1–249
U. S. Snow, Ice and Permafrost Research Establishment, 8.1–55
U. S. Weather Bureau, 8.1–39, 8.1–40, 8.1–41, 8.1–90, 8.1–92, 8.1–107, 8.1–218, 8.1–249, 8.1–306, 8.1–318, 8.1–364
Untersteiner, N., 8.1–236, 8A–56
Uruguay. Servicio Meteorológico, 8.1–31

Valníček, B., 8A–43
Van Bladel, J., p. 121
Vandenplas, A., 8.1–19
Vasino, C. J., 8.1–346, 8.1–350
Vassy, A., 8A–42
Vassy, E., 8A–42
Veldkamp, J., 8.1–25

Venkataraman, K. S., 8.1–188
Venkateswara Rao, D., 8.1–374
Verber, J. L., 8.1–313
Vercelli, F., 8.1–65, 8.1–320, 8A–29
Veress, L., 8.1–1
Veronis, G., 8.1–66
Verwoorst, F., 8.1–328
Viaut, A., 8.1–43
Visser, S. W., 8A–110
Vogt, D. E., 8.1–88
Voigt, H. H., 8.1–223, 8.1–227
Voigts, H., 8A–59
von Kármán, T., 8.1–8
Von Neumann, J., 8.1–162
Voppel, D., 8.1–86
Vowinckel, E., 8.1–354
Wace, N. M., 8.1–14
Wackernagel, H. B., 8.1–26
Wadati, K., 8.1–60
Walker, F. T., 8A–111
Wasserfall, K. F., 8A–51, 8A–52
Watanabe, K., 8.1–38
Watanabe, T., 8.1–166, 8.1–245
Watts, I. E. M., p. 121
Weather Services, Inc., 8A–113, 8A–117
Wegener, M., 8.1–213
Weil, J., 8.1–392
Weiss, L. L., 8.1–289
Wexler, H., 8A–76, 8A–112
White, A. D., 8.1–46
White, R. M., 8.1–196
Willett, H. C., 8A–34, 8A–50, 8A–113, 8A–117
Wilson, W. T., 8.1–289
Wippermann, F., 8.1–167
Woffinden, C. M., 8.1–197
Woodruff, N. P., 8.1–250
World Meteorological Organization. Commission for Synoptic Met., 8.1–27
World Meteorological Organization, WMO Bulletin, 8.1–28 to 8.1–30
Wulsin, F. R., 8.1–339

Zách, A., 8.1–1
Zaichikov, V. T., 8.1–309
Zimmershied, W., 8.1–168

INDEX OF SUBJECTS

Absolute topography, 8.1–242
Acclimatization, 8.1–346
Advection, 8.1–165
Advective dynamic analysis, 8.1–161
Aerobee H. rockets, 8.1–136
Aerobee rocket instrumentation, 8.1–134
Aerobee rockets, 8.1–137
Aerodynamics, 8.1–8
Aeronautical meteorological codes, 8.1–92
Aeronautical meteorological services, 8.1–39
Aeronautical meteorology, 8.1–90, 8.1–91
Aerosol coagulation, 8.1–268
Afforestation, 8.1–334
Ageostrophic winds, 8.1–245
Agricultural meteorology, 8.1–15, 8.1–94
Agrometeorological forecasting, 8.1–94
Air-borne instruments, 8.1–90
Air conditioning, 8.1–38
Air density effects, 8.1–175
Air mass modification, 8.1–237
Air masses, 8.1–168
Aircraft landing aids, 8.1–90, 8.1–364
Aircraft operating problems, 8.1–89
Airport climatology, 8.1–308
Airways forecasting, 8A–80
Aleutian low, 8.1–203
Altitude horizon indicators, 8.1–134
Angular momentum flux, 8.1–196
Animal ecology, 8.1–341
Animal population, 8A–17
Annual infrared radiation variations, 8.1–222
Annual meteorological data summaries, 8.1–127 to 8.1–131
Annual meteorological reports, 8.1–126
Annual precipitation, 8.1–231
Annual sferics variations, 8.1–122
Annual society reports, 8.1–35
Annual soil temperature variations, 8.1–93
Annual temperature, 8.1–231
Annual temperature variations, 8.1–228, 8.1–229
Anomalous radio propagation, 8.1–396
Antarctic observational program, 8.1–24
Anticyclone structure, 8.1–235
Apollov, B. A., 8.1–45
Applied meteorology, 8.1–1
Arctic flights, 8.1–33
Areal evaporation distribution, 8.1–262
Arid zone ecology, 8.1–337
Arid zones, 8.1–334, 8.1–335, 8.1–336
Artificial clouds, 8.1–173
Artificial precipitation, 8.1–269
Artificial precipitation bibliographies, 8.1–8.1–2
Artificial precipitation symposia, 8.1–2
Aspiration psychrometers, 8.1–156
Assmann psychrometer, 8.1–148
Astronomic meteorology, 8.1–243
Astrophysical observatories, 8.1–38
Astrophysical research, 8.1–37
"Atka" Antarctic Expedition, 1954–55, 8.1–24
Atmospheric absorption bands, 8.1–184
Atmospheric circulation, 8.1–6, 8A–62, 8A–82
Atmospheric circulation anomalies, 8.1–197, 8.1–204, 8.1–205, 8A–7, 8A–28, 8A–67, 8A–113
Atmospheric circulation-sunspot relationships, 8A–113
Atmospheric disturbances, 8.1–189, 8.1–288, 8A–71
Atmospheric electricity measurements, 8.1–376
Atmospheric motion, 8.1–184
Atmospheric pollution studies, 8.1–363
Atmospheric structure, 8.1–174
Atmospheric waves, 8.1–241
Atomic explosion effects, 8.1–383
Atomic explosion effects on weather, 8.1–101
Atomic physics, 8.1–362
Auroral helium particles, 8.1–387
Auroral model experiments, 8.1–388
Auroral observations, 8.1–114
Auroral spectra, 8.1–388
Auroral zones, 8A–83
Aviation forecasts, 8.1–182

Baroclinic instability, 8.1–192
Barometer corrections, 8.1–117
Barometric tendency calculation, 8.1–161

Bibliography of WMO publications, 8.1–30
Bibliography on pressure pattern flying, 8.1–91
Bioclimatology, 8.1–98, 8.1–224, 8.1–340, 8A–40
Biography, 8.1–45, 8.1–46, 8.1–47, 8.1–48, 8.1–49, 8.1–59
Biometeorology, 8.1–103
Blocking action, 8.1–193, 8.1–195
Blocking waves, 8.1–194
Boundary value problems, 8.1–110
British Meteorological Office, 8.1–74
Building materials, 8.1–105

Cambium temperatures, 8.1–326
Captive balloons, 8.1–376
Ceiling and visibility measurements, 8.1–90
Ceilometer observations, 8.1–364
Charney-Eliason method, 8.1–164
Chloride particle identification, 8.1–271
Chromospheric eruptions, 8.1–390, 8A–43
Circulation patterns, 8.1–199
Circumpolar baric waves, 8.1–242
Climate and man, 8.1–339
Climate of Australia, 8.1–314
Climate of Canadian Arctic, 8.1–14
Climate of Central Canada, 8.1–14
Climate of China, 8.1–309
Climate of Dothan, Alabama, 8.1–318
Climate of Hudson Bay Region, 8.1–312
Climate of Hungary, 8A–107, 8A–108
Climate of South Bass Island, 8.1–313
Climate of State College, Miss., 8.1–316
Climatic analysis, 8.1–332
Climatic changes, 8A–8
Climatic classification techniques, 8.1–333
Climatic classifications, 8.1–327, 8.1–329, 8.1–331
Climatic cycles, 8.1–320, 8A–48
Climatic data, 8.1–129, 8.1–314, 8.1–332
Climatic data for Sierra Leone, 8.1–131
Climatic data summaries, 8.1–316
Climatic data tables, 8.1–315
Climatic regions, 8.1–328
Climatic variations, 8.1–319, 8A–34, 8A–75
Climatological research, 8.1–307
Climatology, 8.1–75, 8.1–309
Cloud chamber studies, 8.1–226
Cloud frequencies, 8.1–233
Cloud physics, 8.1–269
Cloud physics symposia, 8.1–5
Cloud structure, 8.1–283
Cold springs, 8.1–197
Cold wave frequencies, 8.1–231
Color of sea water, 8.1–65
Comfort climate, 8.1–346
Commercial pilots, 8.1–39
Compendium articles, 8A–34
Computation methods, 8.1–120
Condensation processes in soil, 8.1–302
Conference reports, 8.1–21, 8.1–27
Constant vorticity trajectories, 8.1–182
Continentality, 8.1–350
Convective activity, 8.1–202
Convergence and divergence, 8.1–203
Cool summers, 8.1–194
Coriolis force, 8.1–191
Coronal emission data, 8A–47
Coronal emission intensity variations, 8A–45
Correction tables, 8.1–116
Correlation coefficients, 8.1–98
Correlation theory, 8.1–118, 8A–2
Correlations, 8A–36
Cosmic ray research, 8.1–37, 8.1–226
Cosmic ray variations, 8.1–181
Cosmic ray velocity, 8.1–225
Cows, 8.1–98
Creswell, M., 8.1–46
Crop ecology, 8.1–93
Cumulus cloud structure, 8.1–267, 8.1–280
Cycles, 8A–8, 8A–88
Cyclogenesis, 8.1–186
Cyclone, East Coast (Dec. 1952), 8.1–186
Cyclone development, 8.1–183
Cyclone movement forecasting, 8.1–163
Cyclone tracks, 8.1–195, 8A–63, 8A–68

D layer, 8.1–181
De-icing of aircraft, 8.1–275
Dew, 8.1–272
Dew effects on plant growth, 8.1–272
Dew meters, 8.1–272
Dew point hygrometers, 8.1–149
Dew point recorders, 8.1–157
Dew point temperature, 8.1–259
Differential kinematics, 8.1–168
Diffusion equations, 8.1–70
Divergence analysis, 8.1–203
Divergence computations, 8.1–8.1–166
Divergence forecasting, 8.1–188
Doppler displacement of He lines, 8.1–388
Drift currents, 8.1–66
Drifting snow profiles, 8.1–294
Drop accretion, 8.1–282
Drop impingement on aero engines, 8.1–87
Drop impingement on airfoil, 8.1–88
Drop size data, 8.1–267
Drop size distribution, 8.1–282
Drop size distribution in clouds, 8.1–279
Drop velocities, 8.1–282
Drought, Southwestern U. S. (1954–55), 8.1–197
Dry and wet spells, 8.1–19
Dust storms, 8.1–251
Dust storms, Kansas (1954), 8.1–250
Dynamic climatology, 8.1–353
Dynamic meteorology textbooks, 8.1–6
Dynamics of the atmosphere, 8.1–191

E layer ionization, 8.1–180
E layer winds, 8.1–254
Eclipse effects, 8.1–391
Eclipse effects on short wave transmission, 8.1–356
Eclipse meteorology, 8.1–355
Ecoclimatology, 8.1–335
Electric hygrometers, 8.1–138
Electrical conductivity measurements, 8.1–380
Electrical discharges in gases, 8.1–388
Electrification of clouds, 8.1–378
Electromagnetic waves, 8.1–395
Electrometers, 8.1–377
Electronic computers, 8.1–162
Elementary meteorology, 8.1–13
Energy balance, 8.1–264
Engineering design data processing, 8.1–107

Environmental influences, 8.1–339
Equivalent headwinds, 8.1–120
Etesian winds, 8A–70
Evaporation data, 8.1–266
Evaporation from plane surfaces, 8.1–261
Evaporation from water surfaces, 8.1–266
Evaporation measurement, 8.1–263
Expeditions, 8.1–32
Extended forecasting, 8.1–159
Extratropical cyclone development, 8.1–190
Extreme low temperature frequencies, 8.1–34

FAO conferences, 8.1–29
Fisheries weather forecasting, 8.1–78
Flood producing storms, 8.1–292
Floods, 8.1–301
Floods, California (Dec. 1955) 8.1–204
Föhn weather, 8.1–236
Fog intensity, 8.1–277
Forecast accuracy, 8.1–160
Forecasting techniques, 8.1–171
Forest climatology, 8.1–99
Forest ecology, 8.1–349
Forest meteorology, 8.1–352
Forest research bibliographies, 8.1–352
Forest snow protection, 8.1–100
Fraunhoffer, Lajos, 8.1–47
Free air turbulence, 8.1–243
Freezing of rivers, 8.1–319
French meteorological research, 8.1–43
Frictional effects, 8.1–257
Frontal effects on sferics, 8.1–389
Frontal movement, 8.1–160
Frontal zone variation, 8.1–199
Frost data, 8.1–16
Frost frequencies, 8.1–234
Frost heaving, 8.1–239
Frost photographs, 8.1–273
Frost prevention, 8.1–173, 8.1–234
Frost smoke, 8.1–276
Frozen soil depths, 8.1–240
Frozen soil measurements, 8.1–240
Fruit trees, 8.1–326
Fuel requirements, 8.1–106
Funnel clouds, 8.1–217

Gamma distributions, 8.1–287
General circulation, 8.1–321, 8.1–350, 8A–75
Geographical climatology, 8.1–353
Geomagnetic activity, 8.1–86, 8A–103
Geomagnetic data, 8.1–114
Geomagnetic disturbance effects, 8A–84
Geomagnetic variations, 8.1–179
Geophysical data analysis, 8.1–84
Geophysical institutes, 8.1–42
Geostrophic wind computation, 8.1–115
Glacial ablation, 8.1–81, 8.1–83
Glacial periods, 8.1–321
Glacial runoff, 8.1–81
Glacial structure, 8.1–81
Glacier nourishment, 8.1–83
Glacier variations, 8.1–80, 8.1–82, 8.1–298
Global weather data, 8.1–125
Grain crops, 8.1–96
Gregor, Alois, 8.1–48
Gregor's classification, 8.1–329
Grosswetter, 8A–37
Gullying, 8.1–338
Gust loads, 8.1–89

Hair hygrometers, 8.1–151, 8.1–153
Halo frequencies, 8A–103, 8A–104
Halo observations, 8.1–369, 8.1–370, 8.1–372, 8.1–373
Halo periodicities, 8A–101
Harmonic analysis, 8.1–108, 8.1–109, 8.1–228
Hay drying, 8.1–348
Heat balance, 8.1–185, 8.1–324
Heat effects on man, 8.1–345
Heat exchange, 8.1–185
Heat sources and sinks, 8.1–189
Heating and ventilating, 8.1–346
Heating dates, 8.1–229
High altitude flying effects on man, 8.1–103
High altitude optics, 8.1–103
Historical climates, 8A–8
History of aerodynamics, 8.1–8
History of meteorology, 8.1–59, 8.1–60
History of phenology, 8.1–58
Hoar frost, 8.1–273
Honorary degrees, 8.1–52
Horizontal visibility, 8.1–363
Hot climates, 8.1–339
Hot spell frequencies, 8.1–231
Humidity effects on materials, 8.1–105
Humidity instruments, 8.1–145, 8.1–154
Humidity measurement, 8.1–157
Hungarian meteorological service, 8.1–1
Hurricane forecasting, 8A–73
Hydrodynamics, 8.1–187
Hydrologic progress, 8.1–301
Hydrologic publications, 8.1–301
Hydrologists, 8.1–45
Hydrology textbooks, 8.1–9, 8.1–10
Hydrometeorology, 8.1–301
Hydrophysics, 8.1–72
Hygrometry, 8.1–152

Ice crystal formation, 8.1–274
Ice formation, 8.1–275
Ice prevention and removal, 8.1–88
Icing of aircraft, 8.1–87, 8.1–88
Illumination meters, 8.1–158
Indexes, 8.1–53
Indian participation in IGY, 8.1–22
Industrial climatology, 8.1–107
Inertia coefficient, 8.1–151
Infrared radiation effects, 8.1–224
Insect bioclimatology, 8.1–342
Insect climatology, 8.1–343
Instrument shelters, 8.1–132
Insulation, 8.1–105
Integers, 8.1–84
Interdiurnal temperature variations, 8A–107
Interhemispheric circulation relationships, 8.1–205
ICAO meetings, 8.1–29
International code manuals, 8.1–92
International Commission on Solar Terrestrial Relationships, 8A–4, 8A–5, 8M–11, 8A–15
International Geophysical Year, 1957–58, 8.1–21, 8.1–22, 8.1–23
International Geophysical Year program, 8.1–21, 8.1–23 to 8.1–25
I.U.G.G. meeting, Rome, 1954, 8.1–2
Ion diffusion, 8.1–362
Ionospheric data, 8.1–114
Ionospheric density variations, 8.1–176
Ionospheric electron density computation, 8.1–379
Ionospheric height determination, 8.1–379
Ionospheric layers, 8.1–380

onospheric models, 8.1–394
onospheric storms, 8A–74
rrigation, 8.1–305, 8.1–336
rrigation effects, 8.1–324
rrigation requirements, 8.1–303
sohyetal charts, 8.1–119, 8.1–127

et stream, 8.1–193, 8.1–202
et stream anomalies, 8.1–204
et stream profiles, 8.1–201
et stream theory, 8.1–198
upiter, 8A–41
urva, Risto Sakari, 8.1–49
uvenile literature, 8.1–13

Killing frost, 8.1–16
Kinetic energy, 8.1–192
Kinetic energy in atmosphere, 8.1–187

ake hydrology, 8.1–9
ake level variations, 8A–85, 8A–90
emmings, 8.1–341
ight extinction in sea, 8.1–63
ight scattering in sea, 8.1–71
ightning charges, 8.1–385
ightning-rainfall relationships, 8.1–384
ocal weather services, 8.1–44
ocal wind surveys, 8.1–249
ong period precipitation records, 8A–93
ong period records, 8.1–230, 8.1–332
ong range forecasting, 8A–14, 8A–16, 8A–22, 8A–25, 8A–30, 8A–45, 8A–49, 8A–50, 8A–57, 8A–62, 8A–65, 8A–81, 8A–117
ong range precipitation forecasting, 8A–93
oran installation, 8.1–33
ow temperature hygrometry, 8.1–146
uminescence, 8.1–367
ysimeter investigations, 8.1–302

Machine methods, 8.1–169, 8.1–172
Magnetic bay disturbances, 8.1–86
Magnetic disturbances, 8A–35
Magnetic instruments, 8.1–86
Manuals, 8.1–92
Marine disasters, 8.1–76
Marine meteorological observations, 8.1–124
Marine meteorological services, 8.1–74
Marine meteorology bibliographies, 8.1–54
Mars, 8.1–174
Maximum possible precipitation, 8.1–291
Medical meteorology forecasting, 8.1–4
Meridional circulation, 8.1–196
Merino sheep, 8.1–97
Mesoclimatology, 8.1–323
Meteor echoes, 8.1–361
Meteor ionization, 8.1–180, 8.1–361
Meteor ionization trails, 8.1–362
Meteor trails, 8.1–359
Meteor velocities, 8.1–360
Meteor velocity computation, 8.1–175
Meteorological instrument supports, 8.1–132
Meteorological instruments, 8.1–185
Meteorological yearbooks, 8.1–128
Methods for computation, 8.1–120
Mice, 8.1–344
Microclimatic studies, 8.1–313
Micrometeorological observations, 8.1–15, 8.1–147
Micrometeorological services, 8.1–41
Microseisms, 8A–71
Miłata, Władysław, 8.1–50
Minneapolis-Socorro-Gainesville Triangle, 8.1–392
Moisture content determination, 8.1–154
Moisture deficiency, 8.1–331
Moisture index, 8.1–304
Momentum convergence, 8A–83
Monsoon rains, 8.1–292, 8.1–293
Monthly climatic data, 8.1–126

Netherlands participation in IGY, 8.1–25
Networks, 8.1–40
Newspaper articles, 8.1–124
Night airglow spectrum, 8.1–212
Nile floods, 8A–86
Nitrogen bands, 8.1–25
Nitrogen dioxide absorption, 8.1–219
Nocturnal cooling, 8.1–232
Nocturnal radiation, 8.1–222, 8.1–232
Nomograms, 8.1–161
North Sea storm, Feb. 1953, 8.1–183
Nuclei decay, 8.1–270
Nuclei diffusion coefficients, 8.1–270
Numerical forecasting, 8.1–162, 8.1–167
Numerical forecasting techniques, 8.1–164

Oak groves, 8.1–349
Obituaries, 8.1–49, 8.1–50, 8.1–51
Observational data, 8.1–128, 8.1–130
Oceanic circulation theory, 8.1–66
Oceanography bibliographies, 8.1–54
Oceanography for geographers, 8.1–61
Optical phenomena, 8.1–375
Organization charts, 8.1–40
Orographic effect on wind, 8.1–249
Outer atmosphere investigation, 8.1–133
Ozone data, 8.1–114
Ozone variations, 8.1–179
Ozonosphere, 8A–76

Paraselene, 8.1–371
Periodical indexes, 8.1–53
Periodicities, 8A–3, 8A–7, 8A–9, 8A–10, 8A–12, 8A–14, 8A–16, 8A–18, 8A–23, 8A–24, 8A–29, 8A–52, 8A–53, 8A–91
Periodogram analysis, 8.1–320, 8A–19
Persistence, 8A–62
Phosphorescence, 8.1–69
Photoelectric nuclei counters, 8.1–152
Physical oceanography, 8.1–62
Physiological climatology, 8.1–339, 8.1–344
Pilot briefing, 8.1–170
Planetary atmospheres, 8.1–174
Planetary circulation, 8A–41
Planetary influences, 8A–9, 8A–19
Plant ecology, 8.1–272
Plant phenology textbooks, 8.1–7
Plant transpiration measurement, 8.1–265
Point discharges, 8.1–386
Polish Meteorological and Hydrological Society, 8.1–36
Potential gradient, 8.1–377
Potential gradient variations, 8A–98, 8A–99
Precipitation, 8A–33, 8A–94
Precipitation-solar activity correlation, 8A–95
Precipitation cycles, 8A–91, 8A–92

Precipitation periodicities, 8A–108
Precipitation variations, 8A–87, 8A–88
Pressure, 8A–33
Pressure-height error in rawins, 8.1–143
Pressure jump indicators, 8.1–218
Pressure jump networks, 8.1–218
Pressure oscillations, 8A–35
Pressure pattern flying, 8.1–91
Pressure variations, 8A–60, 8A–61, 8A–66, 8A–69, 8A–72, 8A–74, 8A–76, 8A–78, 8A–79, 8A–84, 8A–96
Probability forecasting, 8.1–164
Prognostic charts, 8.1–258
Prognostic surface charts, 8.1–163
Project Vanguard, 8.1–133
Psychrometric constant, 8.1–148
Punched card analysis, 8.1–317
Punched card applications, 8.1–107
Punched card machines, 8.1–109

Quaternary glaciation, 8.1–322

Radar precipitation echoes, 8.1–121
Radar wind instruments, 8.1–142
Radiation, 8.1–358
Radiation climate, 8.1–310
Radiation research, 8.1–26
Radio astronomy, 8.1–37, 8.1–112, 8.1–223
Radio climatology, 8.1–393
Radio meteorology, 8.1–397
Radio transmission duct prediction, 8.1–393
Radio wave propagation, 8.1–394, 8.1–395
Radioactive aerosols, 8.1–382
Radioactive condensation nuclei, 8.1–383
Radioactivity of the atmosphere, 8.1–381
Radiosonde rate of ascent, 8.1–241
Radiosondes, 8.1–142
Radiotelescopes, 8.1–111, 8.1–113
Radium content of coal, 8.1–381
Rain formation, 8.1–279
Rainfall data, 8.1–288
Rainfall depth duration estimation, 8.1–289
Rainfall effects on transpiration values, 8.1–265
Rainfall extremes, 8.1–293
Rainfall forecasting, 8.1–188, 8.1–259
Rainfall frequency distribution, 8.1–285
Rainfall periodicities, 8A–38, 8A–89
Rainfall variations, 8.1–18, 8A–13
Rainstorms, 8.1–290
Rawin errors, 8.1–116, 8.1–143
Record rainfall, 8.1–292
Refraction phenomena, 8.1–366
Refractive index, 8A–64
Regional oceanography, 8.1–61
Regression equations, 8.1–106
Relative topography, 8.1–168, 8.1–255
Rice crops, 8.1–347
River flow, 8.1–70
River hydrology, 8.1–9
River ice breakup, 8.1–319
River level forecasting, 8.1–300
Rocket flights, 8.1–135
Rocket instrumentation, 8.1–135, 8.1–137
Rocket research, 8.1–135
Rolled hair hygrometers, 8.1–153
Rossby's vorticity theory, 8.1–182

Sailing directions, 8.1–75
Saline nuclei, 8.1–271
Satellite observatories, 8.1–26, 8.1–133
Schneider, Rudolf, 8.1–51
Sea ice codes, 8.1–56
Sea ice terminology, 8.1–56
Sea temperatures, 8A–1
Sea turbidity, 8.1–63
Seaweed variations, 8A–111
Secular temperature variations, 8.1–230
Serial publications, 8.1–72
Severe winters, 8A–22, 8A–81
Sferics, 8.1–358, 8.1–390 to 8.1–392
Sferics from air masses, 8.1–122
Sferics from thunderstorms, 8.1–122
Sferics networks, 8.1–392
Sferics recording correlation, 8.1–392
Shallow water wave theory, 8.1–67
Shelter belt effects, 8.1–100
Shelter belts, 8.1–253
Ships' hold climates, 8.1–73
Ships' observational accuracy, 8.1–123
Ships' weather messages, 8.1–77
Shipwrecks, 8.1–76, 8.1–79
Short range forecasting, 8.1–159
Short wave radio transmission, 8.1–356
Silted estuary microclimates, 8.1–324
Silver iodide diffusion, 8.1–382
Silver iodide smoke generators, 8.1–382
Singularities, 8.1–12, 8.1–231, 8.1–354, 8A–35
Small nuclei coagulation, 8.1–270
Snow and ice bibliographies, 8.1–55
Snow courses, 8.1–325
Snow crystal growth, 8.1–297
Snow crystal microphotographs, 8.1–297
Snow damage, 8.1–100
Snow damage to crops, 8.1–96
Snow depth data, 8.1–127
SIPRE bibliography, 8.1–55
Snow line variations, 8.1–298
Snow melt formulas, 8.1–299
Snow melt runoff, 8.1–299
Snow retention, 8.1–336
Snow surveys, 8.1–299
Snowfall data, 8.1–17
Snowflake photography, 8.1–296
Snowflake velocity, 8.1–295
Societies, 8.1–57
Sodium emission, 8.1–221
Soil-air heat exchange, 8.1–185
Soil-air humidity instruments, 8.1–147
Soil-air humidity measurement, 8.1–147
Soil conservation, 8.1–251, 8.1–338
Soil erosion prevention, 8.1–250
Soil heat conductivity measurement, 8.1–139
Soil heat conductivity meters, 8.1–140
Soil moisture, 8.1–302
Soil moisture measurement, 8.1–304, 8.1–306
Soil moisture requirements, 8.1–305
Soil temperature effects, 8.1–95
Soil temperature variations, 8.1–238
Solar activity, 8.1–222, 8A–26, 8A–49, 8A–52, 8A–79, 8A–99, 8A–103
Solar constant, 8A–14
Solar constant during hurricanes, 8A–73

olar coronal green/red ratio, 8A–95
olar cycles, 8A–28, 8A–38, 8A–44, 8A–86, 8A–89
olar eclipse, Feb. 1952, 8.1–377
olar eclipse, June 1954, 8.1–357, 8.1–358
olar eclipse observations, 8.1–357
olar energy variations, 8A–34
olar eruptions, 8A–105
olar—500 mb circulation relations, 8A–83
olar influences, 8A–1 to 8A–5, 8A–10, 8A–11, 8A–13, 8A–15, 8A–19, 8A–20, 8A–21, 8A–26 to 8A–32, 8A–35 to 8A–38, 8A–39, 8A–40, 8A–42, 8A–46 to 8A–48, 8A–54, 8A–57, 8A–71, 8A–73, 8A–74, 8A–76, 8A–78, 8A–81, 8A–91, 8A–92, 8A–94, 8A–101
olar phenomena, 8A–77
olar physics, 8A–27
olar-precipitation relationships, 8A–93, 8A–114
olar radiation, 8A–24
olar radiation attenuation, 8.1–220
olar radiation variations, 8A–36, 8A–60
olar radio radiation, 8.1–227
olar relations, 8A–44
olar rotation, 8A–51, 8A–66
olar-weather relationships, 8A–25, 8A–43, 8A–45, 8A–50, 8A–95, 8A–112, 8A–115, 8A–116, 8A–117
outhern Hemisphere anomalies, 8A–117
pain. National Institute of Geophysics, 8.1–42
onnblick Society, 8.1–35
pectral radiation distribution, 8.1–223
piral ice crystals, 8.1–274
squall forecasting, 8.1–202
tatic stability, 8.1–190, 8.1–191
tatistical analysis, 8.1–317
tatistical forecasting, 8A–117
tatistical methods, 8.1–118, 8.1–291
tatistical studies, 8.1–340, 8A–113
tepling, Josef, 8.1–59
teppe climate, 8.1–338
teppe microclimates, 8.1–324
teppe vegetation, 8.1–337
tochastic functions, 8.1–118
torm floods, North Sea (Feb. 1953), 8.1–183
Stratocumulus dissipation, 8.1–281
Stratosphere, 8.1–178
Subject indexes, 8.1–55
Submarine illumination, 8.1–65
Subsidence inversions, 8.1–235
Sultriness, 8.1–224
Summer precipitation, 8.1–284
Sun's corona, 8A–46
Sun's coronal emissions, 8A–80
Sunspot activity, 8A–69, 8A–100
Sunspot cycles, 8A–7, 8A–9, 8A–12, 8A–16, 8A–17, 8A–20, 8A–23, 8A–56, 8A–59, 8A–63, 8A–67, 8A–70, 8A–77, 8A–87, 8A–96, 8A–98, 8A–102, 8A–110
Sunspot effects, 8.1–199, 8.1–227, 8.1–347, 8A–6, 8A–18, 8A–33, 8A–41, 8A–53, 8A–55, 8A–75, 8A–82, 8A–88, 8A–111
Sunspot effects on precipitation, 8A–108
Sunspot effects on temperature, 8A–58, 8A–107
Sunspot effects on weather, 8A–28, 8A–110
Sunspot numbers, 8A–64, 8A–104
Sunspots, 8A–8, 8A–10, 8A–22, 8A–30, 8A–61, 8A–62, 8A–65, 8A–68, 8A–72, 8A–85, 8A–90, 8A–109
Sutcliffe's development theory, 8.1–188
Symmetry points, 8A–65
Symposia, 8.1–4, 8A–27
Synoptic analysis, 8.1–159, 8.1–160, 8.1–165
Synoptic climatology, 8.1–354
Synoptic forecasting, 8.1–165
Synoptic studies, 8.1–290
Synoptic upper air analysis, 8.1–170

Tables, 8.1–84
Tannehill, I. R., 8.1–52
Telemetering systems, 8.1–136
Temperature, 8A–33
Temperature data, 8.1–230, 8.1–341
Temperature extremes, 8.1–34
Temperature forecasting, 8A–57
Temperature frequencies, 8.1–233
Temperature gradients, 8.1–236
Temperature periodicities, 8A–51, 8A–57, 8A–109
Temperature persistence, 8.1–194
Temperature variations, 8A–1, 8A–52, 8A–54, 8A–55, 8A–59
Textbooks, 8.1–8, 8.1–11, 8.1–13, 8A–106
Thermal continentality, 8.1–351
Thermodynamics of psychrometers, 8.1–144
Thermoelectric measurement, 8.1–141
Thermonuclear explosion effects on weather, 8.1–104
Thornthwaite's classification, 8.1–263, 8.1–327, 8.1–330
Thornthwaite's method, 8.1–264
Three-dimensional weather maps, 8.1–170
Thundercloud charge distribution, 8.1–385
Thunderstorm activity, 8A–32, 8A–102, 8A–105
Thunderstorm electricity, 8.1–385
Thunderstorm forecasting, 8.1–202
Thunderstorm formation, 8.1–378
Thunderstorm variations, 8A–100
Tidal mixing, 8.1–70
Topographic effects, 8.1–244, 8.1–323, 8.1–325
Tornado, Flint, Mich. (June 1953), 8.1–207
Tornado, Nova Scotia (1954), 8.1–200
Tornado, Worcester, Mass. (June 1953), 8.1–207
Tornado damage, 8.1–215
Tornado observations, 8.1–210
Tornado-pressure jump relationships, 8.1–218
Tornado statistics, 8.1–252
Tornado theory, 8.1–213
Tornadoes, 8.1–208, 8.1–212, 8.1–216
Transmissometers, 8.1–364
Transpiration, 8.1–265
Tropical bioclimatology, 8.1–97
Tropical meteorology, 8.1–311
Tropopause analysis, 8.1–171
Tropopause pressure, 8.1–177
Tropopause temperatures, 8.1–177
Turbulence decay, 8.1–184
Turbulence effects, 8.1–294
Turbulent exchange, 8.1–261
Twilight Na, 8.1–114
Twilight phenomena, 8.1–368
Typhoon precipitation distribution, 8.1–287

Ultraviolet radiation, 8A–35
UNESCO documentation, 8.1–29
U. S. Weather Bureau, 8.1–39, 8.1–40, 8.1–41
Upper air analysis, 8.1–169, 8.1–172
Upper air humidity, 8.1–260
Upper air temperature distribution, 8.1–237
Upper air temperature variations, 8A–56
Upper air temperatures, 8.1–177
Upper air wind charts, 8.1–255
Upper air wind forecasting, 8A–80
Upper air wind measurement, 8.1–256
Upper air wind variations, 8.1–255
Utilization of forecasts at sea, 8.1–78

Vapor transfer from boundary layers, 8.1–261
Ventilated psychrometers, 8.1–144, 8.1–150, 8.1–155, 8.1–156
Vertical distribution of electrical conductivity, 8.1–380
Vertical motion, 8.1–201, 8.1–257
Vertical motion prediction, 8.1–258
Visibility, 8.1–364
Visibility in clouds, 8.1–278
Visibility instruments, 8.1–363
Visibility of flashes, 8.1–365
Visibility research, 8.1–365
Vorticity analysis, 8.1–186, 8.1–206
Vorticity equations, 8.1–166

Warm fronts, 8.1–283
Warming of Arctic, 8.1–29
Water conservation, 8.1–266, 8.1–336
Water content of clouds, 8.1–278
Water content of fog, 8.1–145
Water content of snow, 8.1–325
Water losses of mice, 8.1–344
Water vapor transport, 8.1–190
Waterspouts, 8.1–209, 8.1–214, 8.1–216
Wave observations, 8.1–64
Waves in the westerlies, 8.1–192, 8.1–200
Weather and man, 8.1–102
Weather conditions, 8.1–76, 8A–31
Weather effects on fuel consumption, 8.1–106
Weather effects on glaciers, 8.1–83
Weather forecasting, 8.1–11, 8.1–12, 8A–24
Weather modification conferences, 8.1–5
Weather ship observations, 8.1–20
Weather ship "Polar Front I," 8.1–20
Wheat growth, 8.1–95
Whirlwinds, 8.1–211
Wild evaporimeter, 8.1–263
Wind damage statistics, 8.1–252
Wind deviation, 8.1–245
Wind distribution, 8.1–244
Wind driven currents, 8.1–66
Wind effects on precipitation measurement, 8.1–20
Wind effects on sea temperature, 8.1–68
Wind erosion, 8.1–338
Wind frequency data, 8.1–246
Wind insurance, 8.1–252
Wind micronetworks, 8.1–249
Wind profiles, 8.1–256
Wind speed behind shelter belts, 8.1–253
Wind speed effects, 8.1–386, 8.1–253
Wind storms, 8.1–247, 8.1–248
Wind velocity, 8.1–148, 8.1–246
Winter temperatures at Brussels, 8.1–19
Workroom comfort climate, 8.1–345
World climate coverage, 8.1–125
World Meteorological Organization, 8.1–31
WMO. Synoptic Meteorology Commission, 8.1–27
WMO collaboration with international organizations, 8.1–29
WMO meetings, 8.1–28
WMO publications, 8.1–30
WMO Regional Association VI, Europe, 8.1–28

Zonal distribution of sferics, 8.1–389
Zonal wind stress on seas, 8.1–66

INDEX OF GEOGRAPHICAL LOCATIONS

ARCTIC, 8.1–33
Arctic Islands, 8.1–128
Canadian Arctic
Hudson Bay Region, 8.1–312
North American Arctic, 8.1–34
Soviet Arctic, 8A–28
NORTHERN HEMISPHERE, 8.1–125, 8.1–191, 8.1–194, 8.1–242, 8A–113
SOUTHERN HEMISPHERE, 8.1–125
NORTH AMERICA
Alaska, 8.1–75, 8.1–343
Lemon Creek Glacier, 8.1–83
Pt. Barrow, 8.1–341
Canada, 8.1–75, 8A–18
Alberta, 8.1–98
Central Canada, 8.1–14
Nova Scotia, 8.1–208
Greenland, 8.1–146
Myggbukta, 8.1–128
United States, 8.1–40, 8.1–194, 8.1–204, 8.1–252, 8A–45, 8A–49, 8A–59, 8A–68, 8A–94
Alabama
Dothan, 8.1–318
Elba, 8.1–290
California
California Coast, 8.1–54
Chesapeake Bay, 8.1–63
District of Columbia
Washington, 8A–24, 8A–57
Eastern United States, 8.1–195
Illinois
Peoria, 8A–91
Vermillon County, 8.1–210
Kansas
Dodge City, 8.1–250
Western Kansas, 8.1–306
Massachusetts
Camp Wellfleet, 8.1–382
Worcester, 8.1–207
Michigan
Flint, 8.1–207
Mississippi
Leavell Woods, 8.1–247
State College, 8.1–316

Missouri, 8.1–16, 8.1–17
Kansas City, 8A–115
New Mexico
White Sands, 8.1–135
New York
Albany, 8A–92
Long Island
McArthur Field, 8.1–91
New York, 8A–95
Ohio
Cleveland, 8.1–44
South Bass Island, 8.1–313
Oklahoma, 8A–89
Tennessee
Oak Ridge, 8.1–249
Texas, 8A–89
Caribbean Sea, 8.1–368
Central America, 8.1–77
SOUTH AMERICA
Argentina, 8.1–328, 8.1–350
Buenos Aires, 8.1–346
Brazil, 8.1–234, 8.1–342
Ecuador, 8.1–315
EUROPE, 8.1–168, 8A–59, 8A–77, 8A–82
Austria
Brenner Pass, 8.1–236
Innsbruck, 8.1–236
Zirbitzkogel Peak, 8.1–310
Belgium
Brussels, 8.1–19
Uccle, 8.1–19
British Isles, 8.1–228, 8.1–260
Great Britain, 8.1–177
England, 8.1–303
Bircham, Newton, 8.1–283
Exeter, 8.1–277
Jodrell Bank, Manchester, 8.1–361
Kew, 8A–2
Southend-on-Sea, 8.1–211
Yorkshire, 8.1–217
Central Europe, 8A–58
Czechoslovakia, 8.1–262, 8.1–351
Bohemia, 8.1–58, 8.1–59
Bratislava, 8.1–35
Hurbanovo, 8.1–263
Oravsky Podzamok, 8.1–230
Prague, 8A–93
Váh River Valley, 8.1–115
France, 8.1–43, 8.1–327
Northern France, 8.1–94
Germany, 8.1–147, 8.1–159, 8.1–308, 8A–13, 8A–77, 8A–81
Dresden, 8.1–95
Friedrichroda, 8.1–99
Kühlingsborn, 8.1–181
Potsdam, 8.1–358, 8.1–391
West Germany, 8.1–12
Greece, 8A–70
Hungary, 8.1–284
Budapest, 8.1–93, 8.1–233, 8A–107, 8A–108
Italy, 8.1–65, 8.1–317
Milan, 8.1–332
Latvia
Drina River, 8.1–319
Mediterranean Region, 8A–96
Netherlands, 8.1–183, 8.1–216
Wageningen, 8.1–15
Norway, 8.1–127, 8.1–128, 8.1–129, 8A–51, 8A–79
Northwest Norway, 8.1–20
Oslo, 8A–52
Spitsbergen
Longyear, 8.1–114
Tromsö, 8.1–114
Poland, 8.1–36, 8.1–266
Tatra Mountains, 8.1–286
Scandinavia, 8A–35
Spain
Granada, 8.1–231
Sweden
Ronne River Valley, 8.1–
Switzerland
Zurich, 8A–114
U.S.S.R. (European and general), 8.1–10, 8.1–239, 8.1–336, 8.1–338
Caspian River, 8.1–324
Kazakhstan, 8.1–81
Mt. Elbrus, 8.1–222
Moscow, 8.1–274
Osipenko, 8.1–251
Sea of Azov Region, 8.1–251
Stalingrad, 8.1–349
Tuapse, 8.1–214
Volga Region, 8.1–305
ASIA, 8.1–330
China, 8.1–309
India, 8.1–188, 8.1–201, 8.1–202, 8.1–288
Assam, 8.1–292
Bengal, 8.1–292
Bombay, 8.1–293
Calcutta, 8.1–374
Coimbatore, 8.1–384
New Delhi, 8.1–3
Israel, 8.1–335
Japan, 8.1–60, 8.1–229, 8.1–237, 8.1–287, 8.1–347
Aizu District, 8.1–244
Hokkaido, 8.1–145
Honjo, 8.1–376
Honshu, 8.1–215
Iwate Prefecture, 8.1–96
Kushiro, 8.1–240
Matsumoto, 8.1–285
Morioka, 8.1–232
Nagasaki, 8.1–259
Norikura, 8.1–38
Onagawa Magnetic Observatory, 8.1–85
Onahama Sea, 8.1–76
Tateno, 8.1–256
Tsugaru Strait, 8.1–246
Urbandai, 8.1–299
Yoshimo River, 8.1–300
Malay Peninsula
Singapore, 8.1–369
Pakistan, 8.1–334
Turkey
Anatolia, 8.1–337
AFRICA
Belgian Congo
Leopoldville, 8.1–377
Libenge, 8.1–377
Ethiopia, 8.1–298
French West Africa
Lake Victoria, 8A–85, 8A–90
Nyasaland, 8.1–130
Sierra Leone, 8.1–131
South Africa, 8.1–385
Southwest Africa, 8.1–18
AUSTRALASIA
Australia, 8.1–314, 8.1–330, 8.1–331, 8A–59, 8A–88
Melbourne, 8.1–314
Mildura, 8.1–248
Queensland, 8.1–97
Indonesia, 8A–72
Java, 8A–56
OCEANS, SEAS AND ISLANDS
Arctic Ocean
Norwegian Sea, 8.1–20
Atlantic Ocean
North Atlantic, 8.1–64, 8.1–68, 8.1–193, 8.1–373, 8.1–375, 8A–1, 8A–62
Ocean Weather Station M, 8.1–20
South Atlantic, 8.1–209
Gough Island, 8.1–32
South Georgia, 8.1–80
South Orkney Islands, 8.1–354
Indian Ocean
Heard Island, 8.1–323
Mediterranean Sea
Malta, 8.1–126
Pacific Ocean, 8A–78
North Pacific, 8.1–203
Bering Sea, 8.1–75
Western Pacific, 8.1–367